AR TARGET SHEET

The following document was too large to scan as one unit; therefore, it has been broken down into sections.

DOCUMENT#	WA7890008967
TITLE	Dangerous Waste Portion of RCRA Permit for Treatment Storage and Disposal of Dangerous Waste (Part 1 of 2)
EDMC#	0054507
SECTION	4 of 4

APPENDIX 4A

DESIGN DRAWINGS

This appendix contains the following design drawings:

Drawing number	Revision number	ECN	Description
H-2-80543	3	640845 (02/04/99) 649620 (02/04/99) 637393 (03/04/98) and 623646 (09/21/95)	CIVIL/ARCH/STRL/HVAC PLANS, EL, SECT & DETAILS
H-2-80545.1	2		ARCH/STRL ELEVATIONS & DETAILS (SHEET 1 OF 2)
H-2-80545.2	1		ARCH/STRL ELEVATIONS & DETAILS (SHEET 2 OF 2)
H-2-80580.1	4	623646 (09/21/95)	CIVIL STORAGE PAD PLAN, SECT & DET (SHEET 1 OF 2)
H-2-80580.2	3	623646 (09/21/95)	CIVIL STORAGE PAD SECT & DET (SHEET 2 OF 2)
H-2-80605	3		ARCH/STRL PLAN, EL, SECTIONS & DETAILS
H-2-80606.1	2	637479 (09/14/98)	ARCH/STRL SECTIONS & DETAILS (SHEET 1 OF 2)
H-2-80606.2	1	637479 (09/14/98)	ARCH/STRL SECTIONS & DETAILS (SHEET 2 OF 2)
H-2-80739	2	637479 (09/14/98) 620864 (05/08/95)	ARCH/STRL PLAN, ELEVATIONS, SECTIONS & DET
H-2-80901.1	2		STRL FOUNDATION PLAN & DETAILS (SHEET 1 OF 2)
H-2-80901.2	2	617742 (02/24/95) 605651 (01/31/94)	STRL FOUNDATION PLAN & DETAILS (SHEET 2 OF 2)
H-2-131541.1	2	615400 (10/20/94)	STRL FOUNDATION PLAN & DETAILS (SHEET 1 OF 2)
H-2-131541.2	1	615400 (10/20/94)	STRL FOUNDATION PLAN & DETAILS (SHEET 2 OF 2)
H-2-823226	0		Structural Foundation Floor Plan (WC)
H-2-823227	0		Structural Foundation Floor Plan (WC)
H-2-823228	0		Structural foundation Section & Notes

IPF #10
IPF #4

ESSENTIAL
ENGINEERING CHANGE NOTICE

Page 1 of 8

1. ECN 640845

Proj. ECN S

2. ECN Category (mark one) Supplemental [X] Direct Revision [] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	3. Originator's Name, Organization, MSIN, and Telephone No. Kevin Axt, FDNW, B4-39, 373-7640	4. USQ Required? Already ~~Revised~~ Reviewed on SW-USQ-98-039 [] Yes [X] No	5. Date Jan 26, 1999
	6. Project Title/No./Work Order No. 65100701 Task Order 32 2401W Facility Modifications	7. Bldg./Sys./Fac. No. 2401W	8. Approval Designator NA
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) SEE BLOCK 13a	10. Related ECN No(s). NA	11. Related PO No. NA

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	NA	NA Design Authority/Cog. Engineer Signature & Date	NA Design Authority/Cog. Engineer Signature & Date

13a. Description of Change 13b. Design Baseline Document? [] Yes [X] No SC3

ITEM #1: Dwg H-2-80543 SH 1, REV 3 - Add information shown on ECN pages 3-7.

~~ITEM #2: Dwg H-2-80544 SH 1, REV 7 - Modify as shown on page 8.~~

14a. Justification (mark one)

Criteria Change	[]	Design Improvement	[X]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

Facility upgrades required for new mission.

RONALD G. HOLLENBECK
STATE OF WASHINGTON
23750
REGISTERED PROFESSIONAL ENGINEER
1-26-99

R. KEITH NEWHOUSE
STATE OF WASHINGTON
29208
REGISTERED PROFESSIONAL ENGINEER
1/28/99
EXPIRES 5/16/99

15. Distribution (include name, MSIN, and no. of copies)

Const Doc Control	S2-53	IPF #4	H6-26
S. G. Arnold	T4-56	IPF #10	S3-96
N. P. Emerson	T3-04		
F. D. Sargent	T4-03		
J. R. Pyzel	T4-04		
R. L. Louie	B4-09		

RELEASE STAMP

EXPIRES 3/17/00

DATE: FEB 04 1999

HANFORD RELEASE

STA: 5

ID: 12

A-7900-013-1

ENGINEERING CHANGE NOTICE	Page 2 of 8	1. ECN (use no. from pg. 1) 640845

16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	2/1/99 ~~[]~~	Inventory Adjustment Request	[]		[]

indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
(1) RCRA Permit Class Change Determination.		

21. Approvals

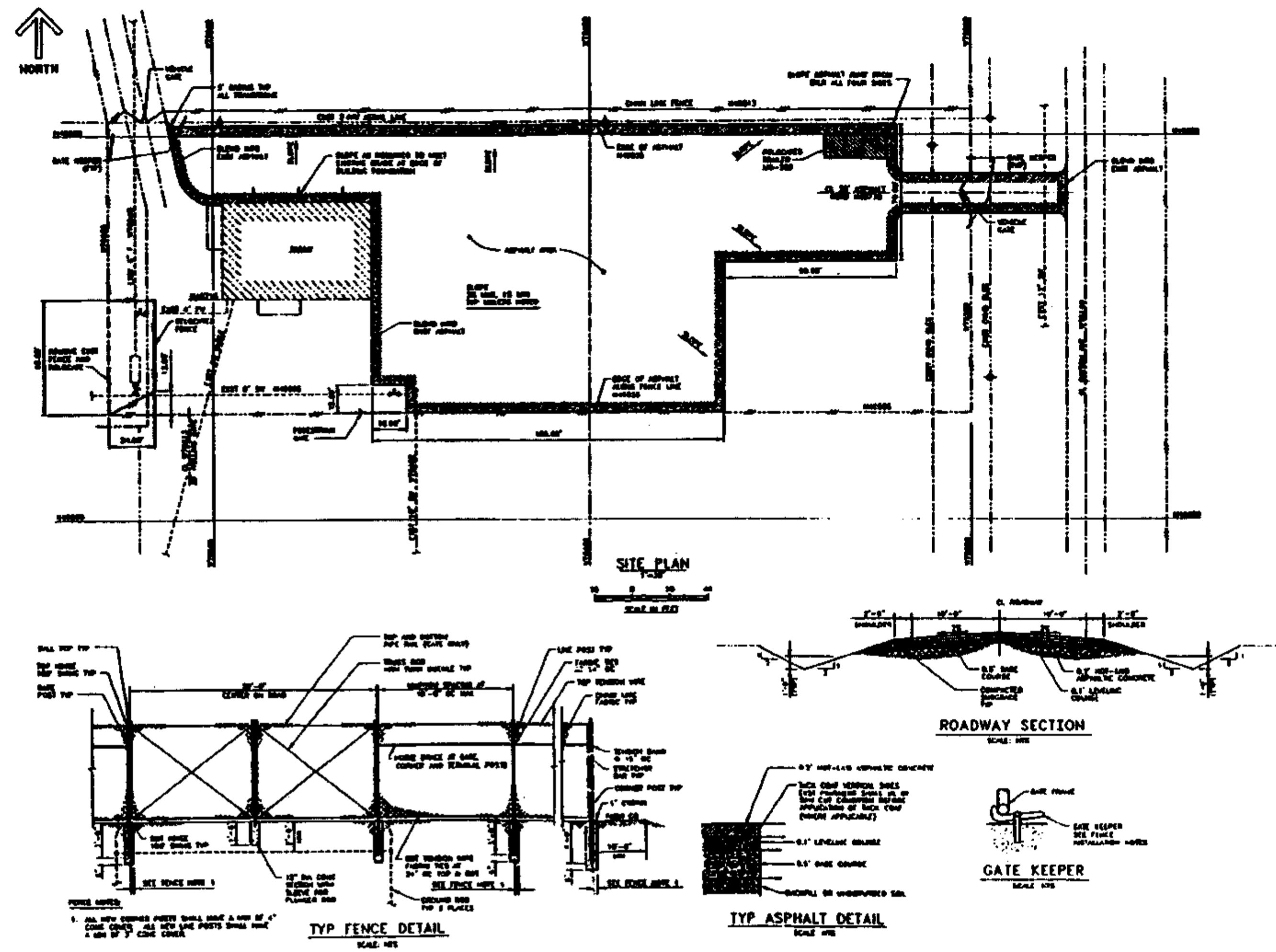
	Signature	Date		Signature	Date
Design Authority	FD Sargent	2/1/99	Design Agent	R Hollenbeck	1-28-99
Cog. Eng.	FD Sargent	2/1/99	PE		
Cog. Mgr.	J. R. Rosser	2/1/99	QA	NA	
~~QA~~ ~~Safety~~	B. BAKER Bobby Baker	2/2/99	Safety	NA	
~~Environ.~~		NA	Design	R L Hollenbeck	1-26-99
Other	Brett Barnes for Permit Class Change	2/2/99	Environ.	NA	
Operations	JE Mitchell	2/2/99	Other		

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

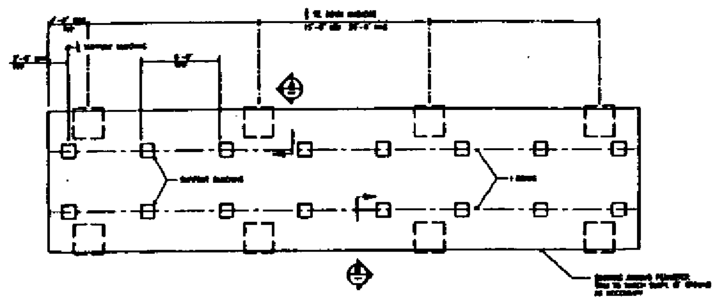
ADDITIONAL

FLUOR DANIEL NORTHWEST, INC.				ENGINEERING CHANGE NOTICE SKETCH		
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80543	1	3	KR AXT	GREG LISLE	640845	3 of 8

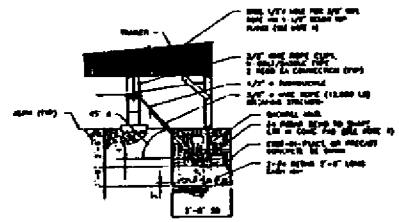


P:\T032\Z080604B

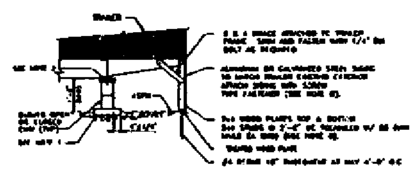
FLUOR DANIEL NORTHWEST, INC.	ENGINEERING CHANGE NOTICE SKETCH					
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80543	1	3	KR AXT	GREG LISLE	640845	4 of 8



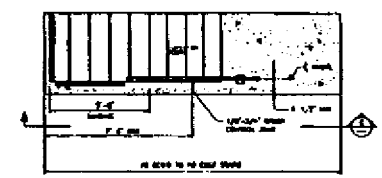
TRAILER TIE-DOWN PLAN



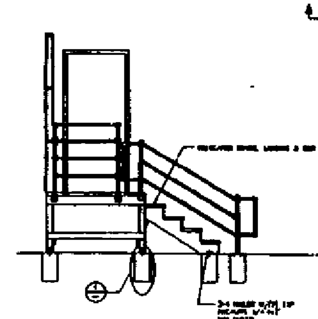
A TIE DOWN DETAIL - TYP



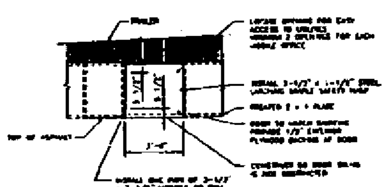
B SKIRTING & SUPPORT BLOCKING - TYP



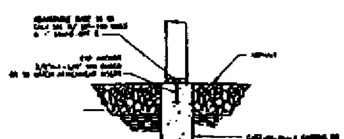
TYP STAIR PLAN



TYP STAIR ELEVATION



TYPICAL SKIRTING ACCESS DOOR

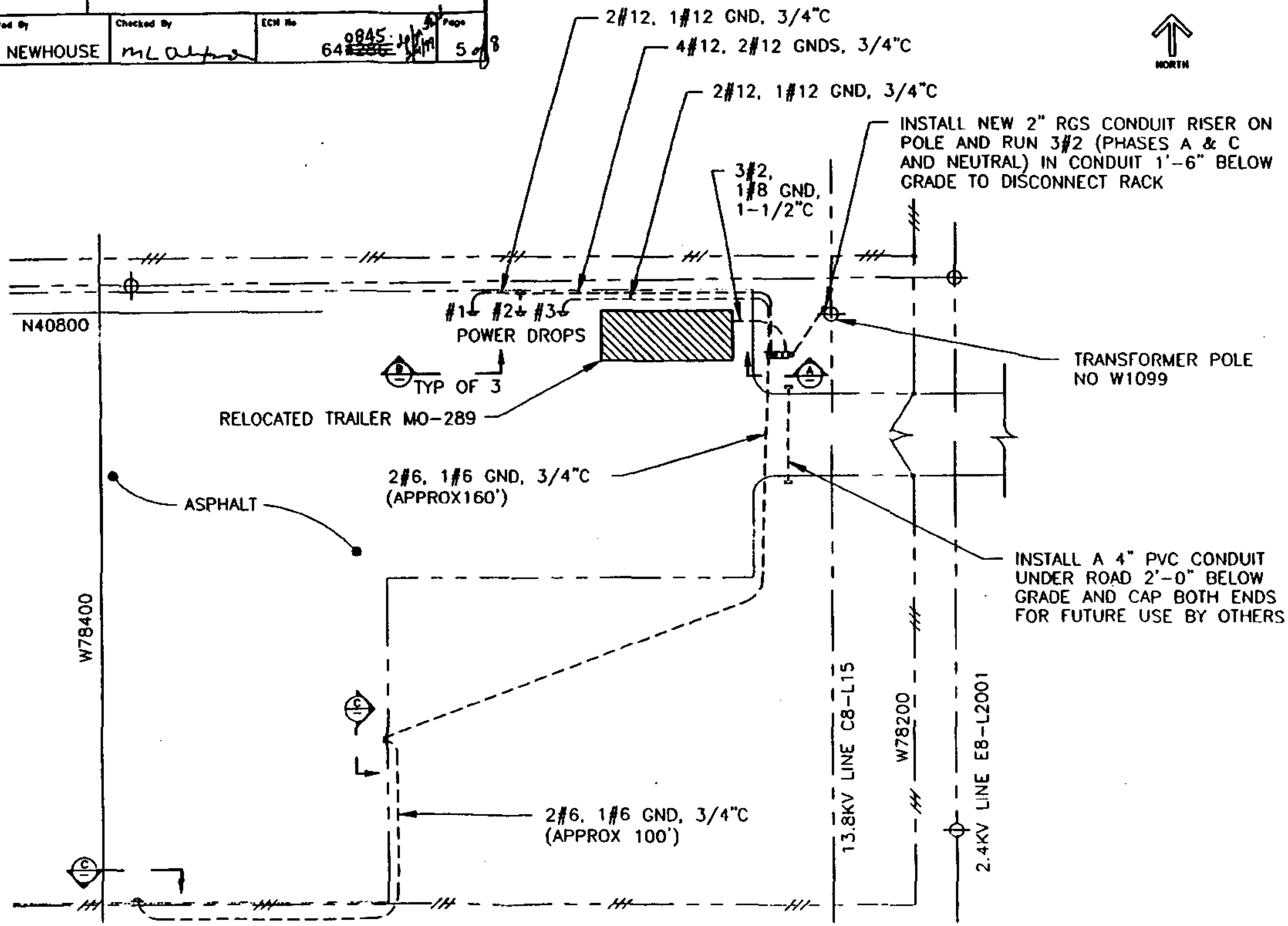


DETAIL

P:\T032\Z060604C

FLUOR DANIEL NORTHWEST, INC.			ENGINEERING CHANGE NOTICE SKETCH			
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80543	1	3	RK NEWHOUSE	M L Ath	64 ~~286~~ 9845	5 of 8

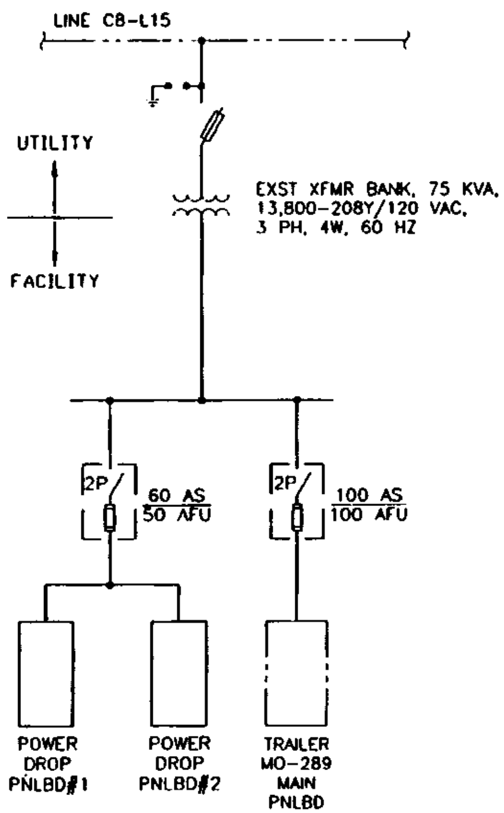
ADD SHEET 2:



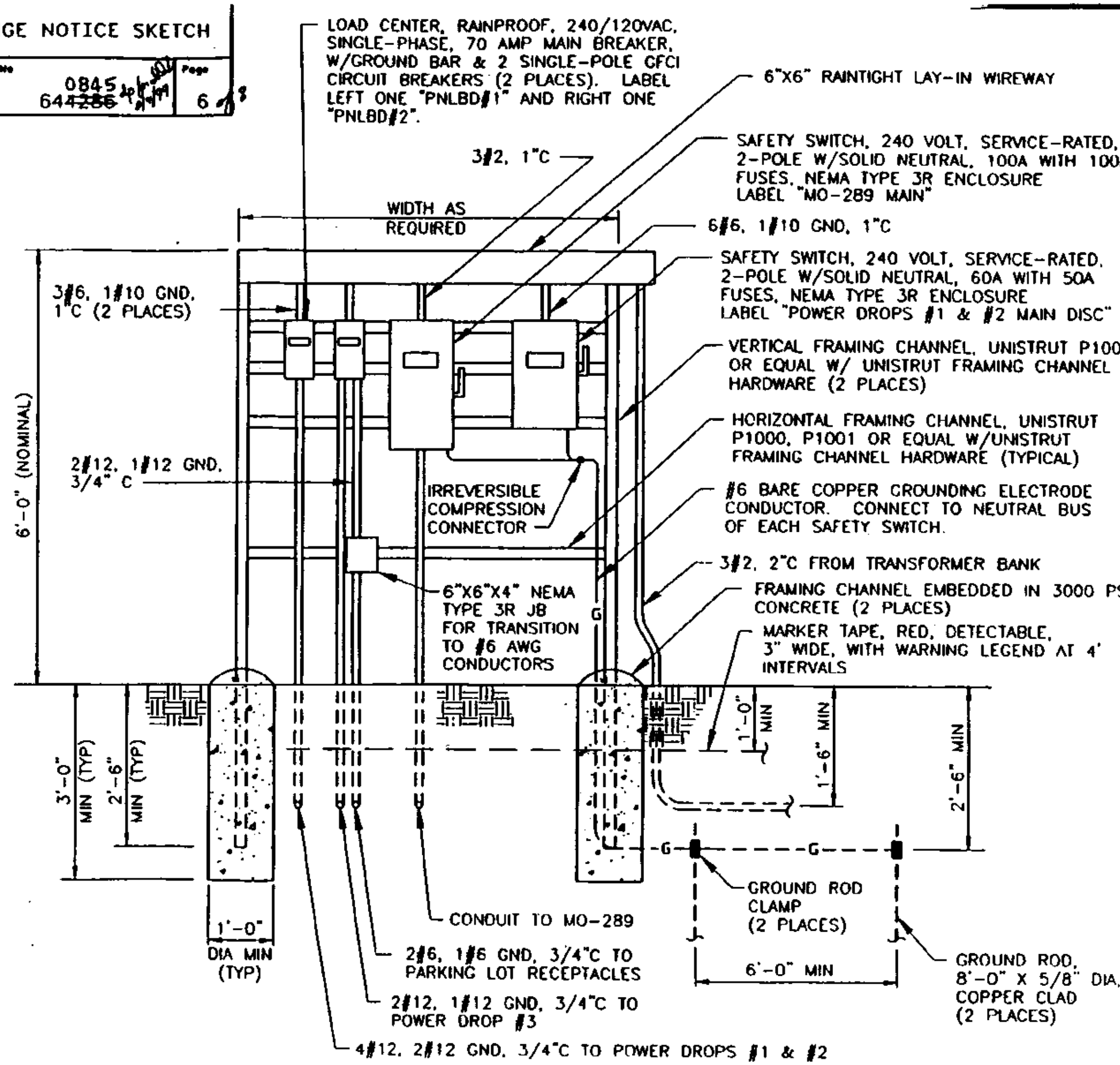
CAD FILE: ECN289E1 PLOT SCALE:

FLUOR DANIEL NORTHWEST, INC.	ENGINEERING CHANGE NOTICE SKETCH				
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80543	1	3	RK NEWHOUSE	M L Alford	0845 ~~644286~~	6 of 8

ADD SHEET 2:



ONE-LINE DIAGRAM
SCALE: NONE



A ELEVATION - DISCONNECT RACK
NTS

CAD FILE: ECN289E2 PLOT SCALE:

FLUOR DANIEL NORTHWEST, INC.	ENGINEERING CHANGE NOTICE SKETCH					
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80543	1	3	RK NEWHOUSE	mcalford	64~~4286~~ 0845	7 of 8

ADD SHEET 2:

PANELBOARD PD 1 LOCATION ______ VOLTS 120 VAC 1PH, 2W
MFG & TYPE ______ CKT BRKR TYPE ______
POWER SUPPLIED FROM ______
NEMA TYPE ENCL 3R ☐ MAIN CKT BRKR ☐ PANELBOARD GROUND FAULT PROTECTION 70 AMP BUS
■ SURFACE MOUNTED ■ MAIN LUGS ONLY 70 AMP NEUT
☐ FLUSH MOUNTED ☐ TOP ☐ BOT ☐ GROUND BUS

SERVICE	KVA	NO.	A | * (70A)	NO.	KVA	SERVICE
POWER DROP #1	1200	1	15A | 15A	2	1200	POWER DROP #2
SPACE		3		4		SPACE
SPACE		5		6		SPACE
SPACE		7		8		SPACE

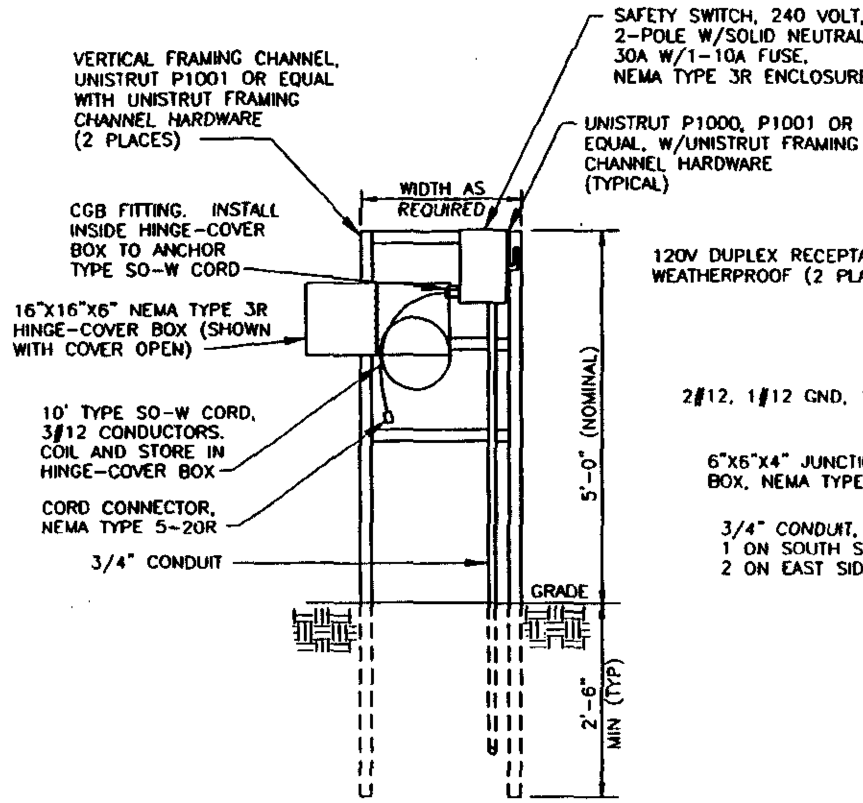
* NO CONNECTION TO THIS BUS
NOTE: ALL BRANCH CIRCUIT BREAKERS SHALL BE GFCI

PANELBOARD PD 2 LOCATION ______ VOLTS 120 VAC 1PH, 2W
MFG & TYPE ______ CKT BRKR TYPE ______
POWER SUPPLIED FROM ______
NEMA TYPE ENCL 3R ☐ MAIN CKT BRKR ☐ PANELBOARD GROUND FAULT PROTECTION 70 AMP BUS
■ SURFACE MOUNTED ■ MAIN LUGS ONLY 70 AMP NEUT
☐ FLUSH MOUNTED ☐ TOP ☐ BOT ☐ GROUND BUS

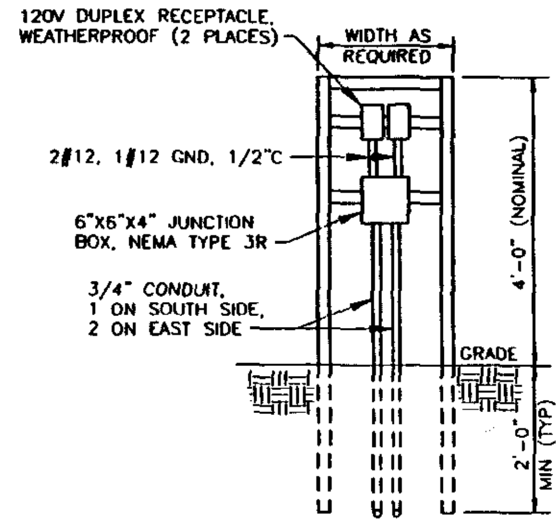
SERVICE	KVA	NO.	C | * (70A)	NO.	KVA	SERVICE
POWER DROP #3	1200	1	15A | 20A	2	720	PARKING LOT RCPTS
SPACE		3		4		SPACE
SPACE		5		6		SPACE
SPACE		7		8		SPACE

* NO CONNECTION TO THIS BUS
NOTE: ALL BRANCH CIRCUIT BREAKERS SHALL BE GFCI

PANELBOARD SCHEDULES



B ELEVATION
NTS



VERTICAL AND HORIZONTAL FRAMING CHANNELS AS IN ELEVATION B

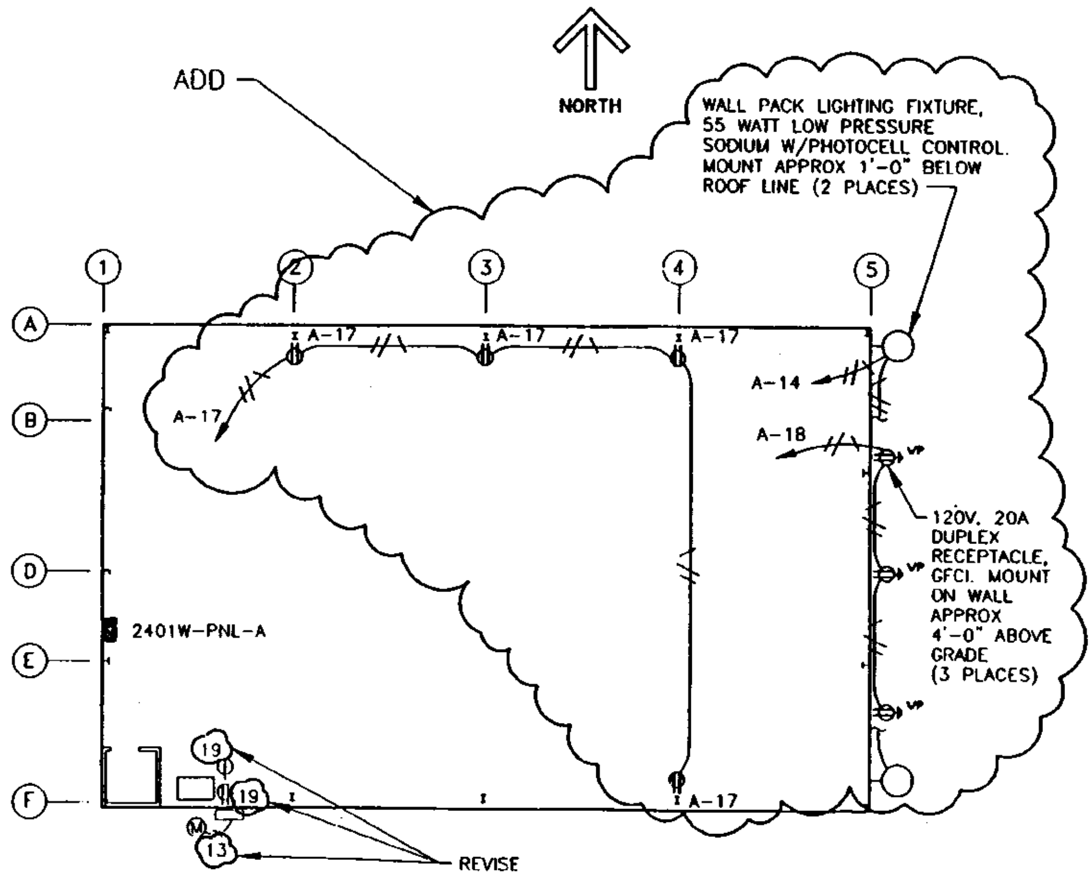
C ELEVATION
NTS

ADD TO NOTES:

1. CONDUITS BURIED UNDER ROADWAY OR PARKING AREAS SHALL BE 2'-0" MIN BELOW GRADE; OTHERS SHALL BE 1'-6" MIN BELOW GRADE.
2. THE ELECTRICAL INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF NFPA 70, 1996.
3. THE POLE RISER INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF IEEE C2, 1997.
4. STEEL CONDUIT INSTALLED BELOW GRADE SHALL HAVE PVC COATING.
5. CONDUITS INSTALLED BELOW GRADE MAY BE TYPE A PVC.

CAD FILE: ECN289E3 PLOT SCALE:

FLUOR DANIEL NORTHWEST, INC.				ENGINEERING CHANGE NOTICE SKETCH		
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80544	1	7	RK NEWHOUSE	M L Alford	640845	8 of 8



POWER/LIGHTING PLAN

CAD FILE: ECN289E4 PLOT SCALE:

IPF #10
IPF #4

ESSENTIAL
ENGINEERING CHANGE NOTICE

1. ECN 649620

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [] Change ECN [] Temporary [] Standby [] Supersedure [X] Cancel/Void []	RK Newhouse, FDNW, G3-08, 376-2392	[X] Yes [] No	Jan 25, 1999
	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
	65100731 Task Order 32 Bldg 2401W Service Upgrade	2401W	S
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.)	10. Related ECN No(s).	11. Related PO No.
	See Block 13	649619	NA

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	NA	NA Design Authority/Cog. Engineer Signature & Date	NA Design Authority/Cog. Engineer Signature & Date

13a. Description of Change 13b. Design Baseline Document? [X] Yes [] No

This ECN supercedes ECN #649619.

DOCUMENTS AFFECTED:

H-2-80543, Sheet 1, Rev. 3
H-2-80544, Sheet 1, Rev. 7
H-2-80544, Sheet 2, Rev. 1

R. KEITH NEWHOUSE
STATE OF WASHINGTON
29208
REGISTERED PROFESSIONAL ENGINEER
R Keith Newhouse 1/26/99
EXPIRES 5/16/99

See Page 3 for Description of Change

14a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

Client request for facility upgrades required for new mission.
Design verification is performed by Independent Review

15. Distribution (include name, MSIN, and no. of copies)

Constr Doc Control	S2-53	CK Stephensen	S2-53
SG Arnold	T3-07	IPF #4	H6-26
NP Emerson	T3-04	IPF #10	S3-96
FD Sargent	T4-03		
DR Pyzel	S6-30		
RL Louie	G3-17		
JT DePousie	S2-57		

RELEASE STAMP
FEB 04 1999
DATE:
STA: 5
HANFORD RELEASE
ID: 12

A-7900-013-2 (05/96) GEF095

A-7900-013-1

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 649620

16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[X] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[] No	Savings	[] $	Savings	[] $	Delay	[]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[X]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
(1) RCRA Permit Class Change Determination		

21. Approvals

	Signature	Date		Signature	Date
Design Authority	FD Sargent FD Sargent	2/1/99	Design Agent	GM CRC	1-26-99
Cog. Eng.	FD Sargent FD Sargent	2/1/99	PE		
Cog. Mgr.	JR Rosser JRMosey	2/1/99	QA	N/A	
~~QA~~			Safety	N/A	
Safety	B. BAKER ~~GD Huckle~~ Bobby Baker	2/2/99	Design	R.K. Newhouse	1/25/99
~~Environ.~~		NA	Environ.	N A	
Other Brett Barnes for Permit Class Change	Brett M Barnes	2/2/99	Other		
IHD. REVIEW		1/2/99			
Operations	JE Mitchell J Mitchell	2/2/99			

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

H-2-80543, Sh1, Rev 3:

Delete Section A in zone F-8. Add new sheet 2 to drawing. Convert 2.4KV line serving building 2401W to 13.8KV. Replace pole W782, line conductors, transformer, and 60-amp service with new 200-amp service as shown on page 4.

H-2-80544, Sh 1, Rev 7:

Replace panelboard in building 2401W with new 200-amp panelboard and replace panelboard schedule as shown on page 8. Delete Section View A from drawing.

H-2-80544, Sh 2, Rev 1:

Install new poles and disconnect rack as shown on pages 5, 6 & 7. Relocate existing disconnect switch for Low Flashpoint Storage Modules from pole to new rack and install handhole to facilitate extending modules' service conductors to new rack.

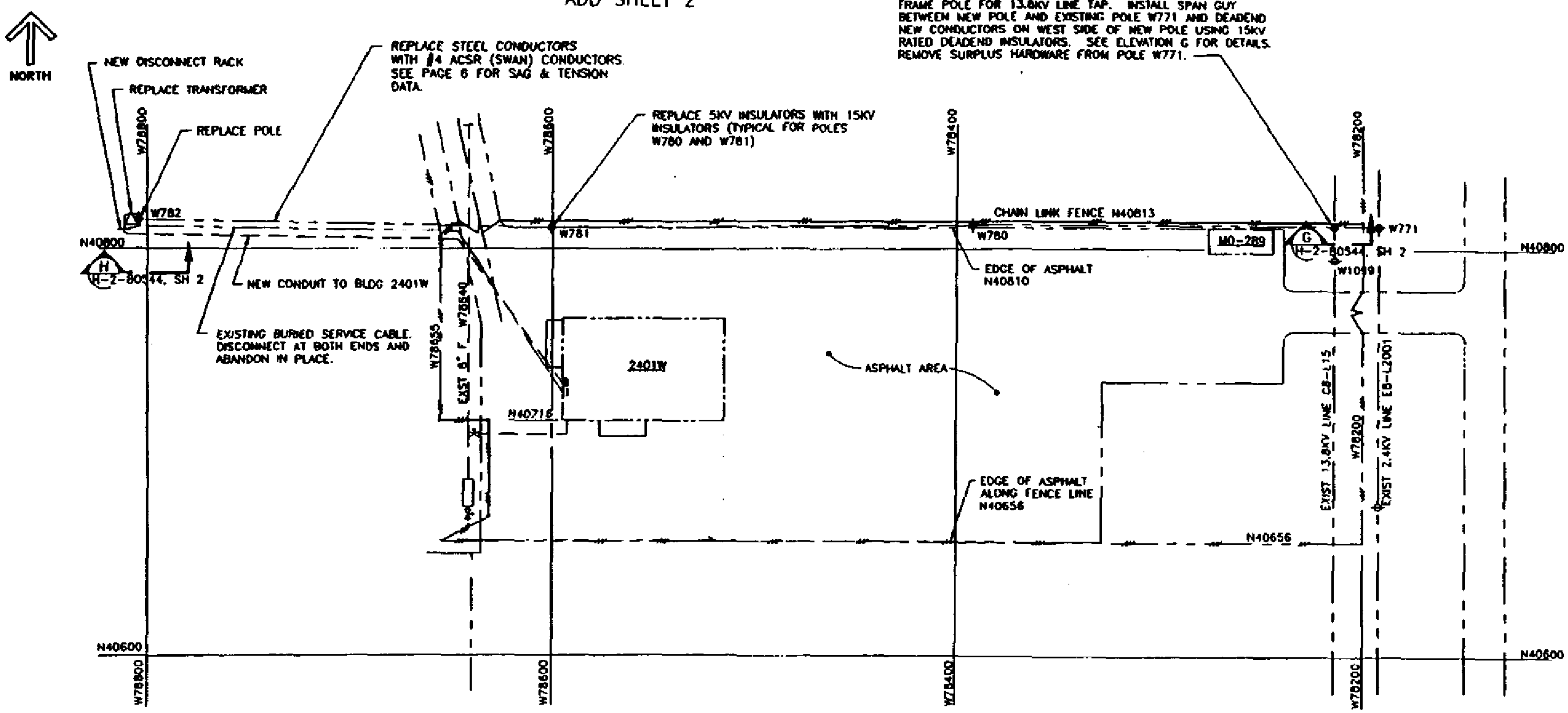
CONSTRUCTION NOTES:

1. WORK SHALL BE PERFORMED IN ACCORDANCE WITH ANSI C2, NFPA 70, AND THE DRAWINGS.
2. WORK ON THE UPPER PORTION OF POLES SHALL BE PERFORMED BY QUALIFIED LINEMEN IN ACCORDANCE WITH WAC 296-45 AS APPLICABLE.
3. ABBREVIATIONS ARE PER ASME Y1.1.
4. UNDERGROUND CONDUIT SHALL BE PVC INSTALLED 24" BELOW GRADE. INSTALL RED MAGNETIC MARKER TAPE 12" BELOW GRADE OVER CONDUIT.
5. POLES SHALL BE WESTERN RED CEDAR CUT FROM LIVE STOCK, SHALL CONFORM TO ANSI STANDARD 5.1, AND SHALL BE AIR SEASONED AND BUTT TREATED IN ACCORDANCE WITH AWPA C7.
6. CROSSARMS SHALL BE SOLID DOUGLAS FIR, PENTACHLOROPHENOL-PETROLEUM TREATED, DRILLED AND MANUFACTURED IN ACCORDANCE WITH REA STANDARD M-19 AND SPEC DT-5B.
7. TRANSFORMER SHALL BE OIL-FILLED, POLE-MOUNTED, FOR USE ON A 13.8KV DELTA SYSTEM AND SHALL CONFORM TO ANSI C57.12.00 & C57.12.20 AND NEMA TRI-1980. IT SHALL HAVE TWO 2-1/2% TAPS ABOVE NORMAL AND TWO 2-1/2% TAPS BELOW NORMAL, COPPER WINDINGS, AND R-TEMP COOLANT CERTIFIED LESS THAN 1 PPM PCB.
8. CUTOUTS SHALL BE RATED 15KV, 95KV BIL, 10,000 AMPS ASYMMETRICAL, LEAKAGE DISTANCE TO GROUND 8.5" MIN, WITH BRONZE EYE BOLT CONNECTOR, PER ANSI C37.41.
9. LIGHTNING ARRESTERS SHALL BE HEAVY DUTY DISTRIBUTION CLASS, SILICON RUBBER HOUSED, METAL OXIDE WITH DUTY CYCLE VOLTAGE RATING OF 18KV RMS, MAXIMUM CONTINUOUS OPERATING VOLTAGE (MCOV) OF 15.3KV, PER ANSI/IEEE C62.11.
10. HANDHOLE AND COVER SHALL BE UTILITY VAULT COMPANY SERIES 1324 OR EQUAL.

FLUOR DANIEL NORTHWEST, INC.				ENGINEERING CHANGE NOTICE SKETCH		
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80543	1	3	RK NEWHOUSE		649620	4 of 8

ADD SHEET 2

SET NEW 45', CLASS 2 POLE AT INTERSECTION OF 13.8KV LINE AND 2.4KV LINE (APPROXIMATE HANFORD COORDINATES N40811, W78214) TO INCREASE LINE CLEARANCE OVER MO-289. FRAME POLE FOR 13.8KV LINE TAP. INSTALL SPAN GUY BETWEEN NEW POLE AND EXISTING POLE W771 AND DEADEND NEW CONDUCTORS ON WEST SIDE OF NEW POLE USING 15KV RATED DEADEND INSULATORS. SEE ELEVATION G FOR DETAILS. REMOVE SURPLUS HARDWARE FROM POLE W771.

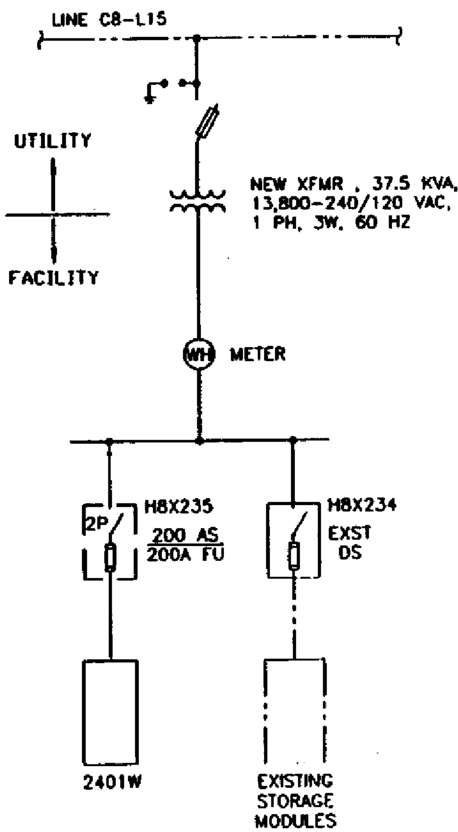


SITE PLAN

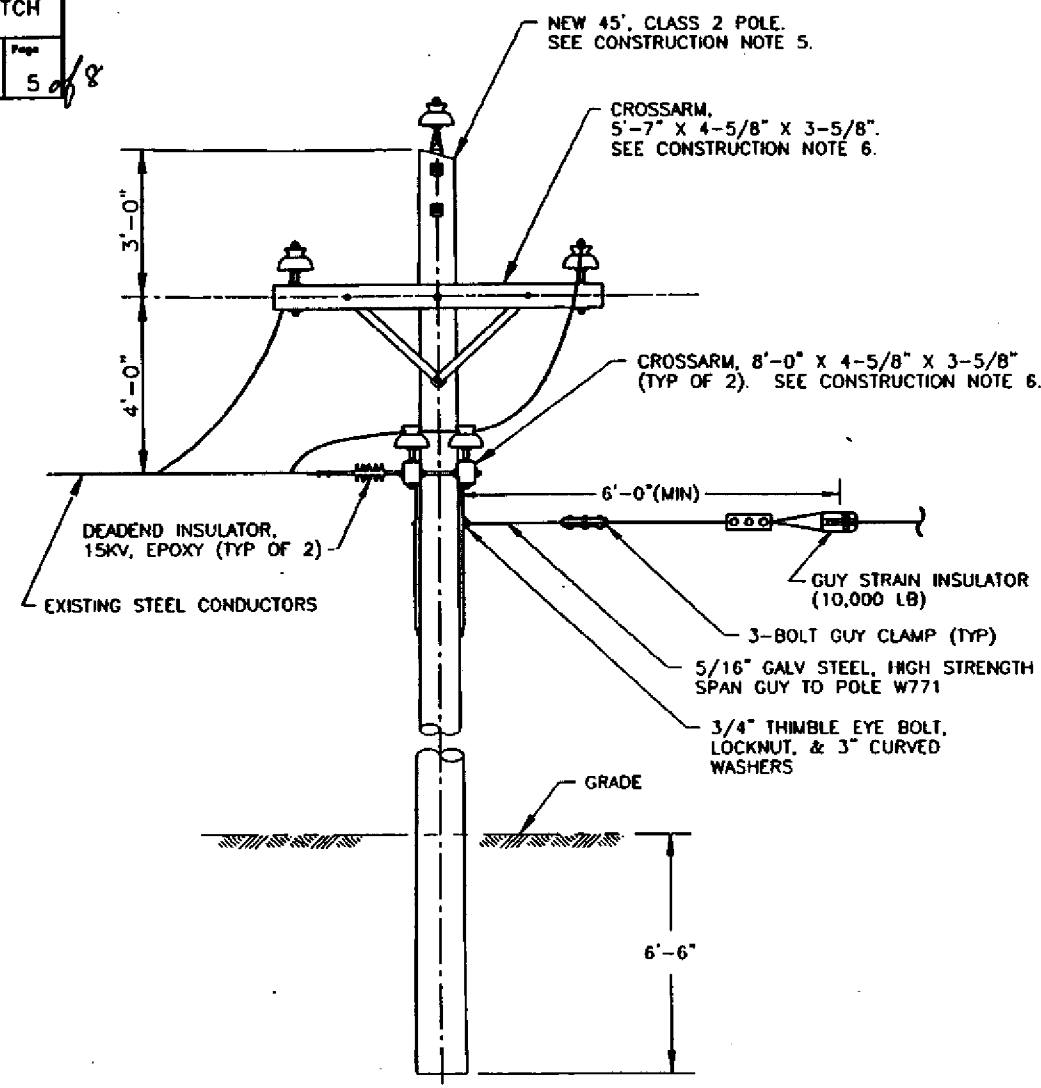
20 0 20 40
SCALE IN FEET

CAD FILE: EC2401AR PLOT SCALE:

FLUOR DANIEL NORTHWEST, INC.	ENGINEERING CHANGE NOTICE SKETCH					
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80544	2	1	RK NEWHOUSE	C. Lee	649620	5 of 8



ONE-LINE DIAGRAM
SCALE: NONE

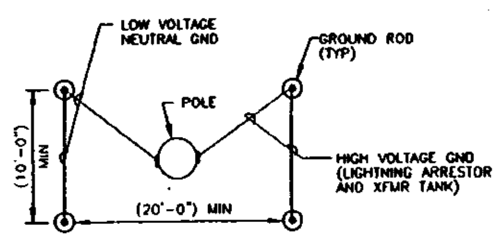


G ELEVATION
H-2-80543 NTS

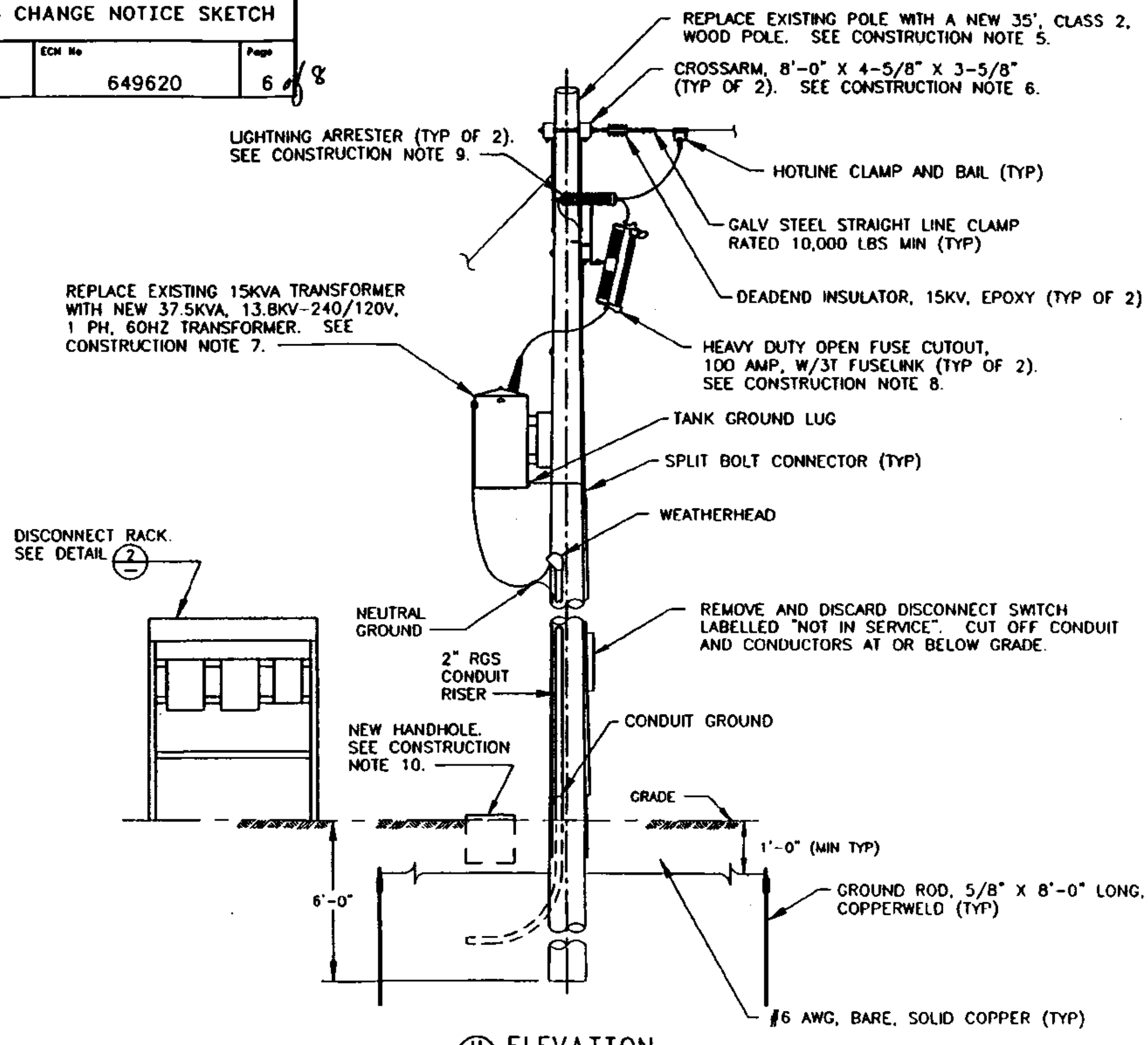
CAD FILE: EC2401BR PLOT SCALE

FLUOR DANIEL NORTHWEST, INC.				ENGINEERING CHANGE NOTICE SKETCH		
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80544	2	1	RK NEWHOUSE	R.Lee	649620	6 of 8

SAG & TENSION TABLE		
INITIAL CONDITIONS		
TEMP (DEG F)	SAG (FEET)	TENSION (LBS)
15	0.51	573
30	0.58	505
60	0.77	372
90	1.16	251
120	1.82	161
FINAL CONDITIONS		
TEMP (DEG F)	SAG (FEET)	TENSION (LBS)
15	0.54	542
30	0.63	466
60	0.91	322
90	1.45	202
120	2.25	130
MAXIMUM DOWN GUY TENSION: 4322 LBS		
MAXIMUM SPAN GUY TENSION: 1667 LBS		



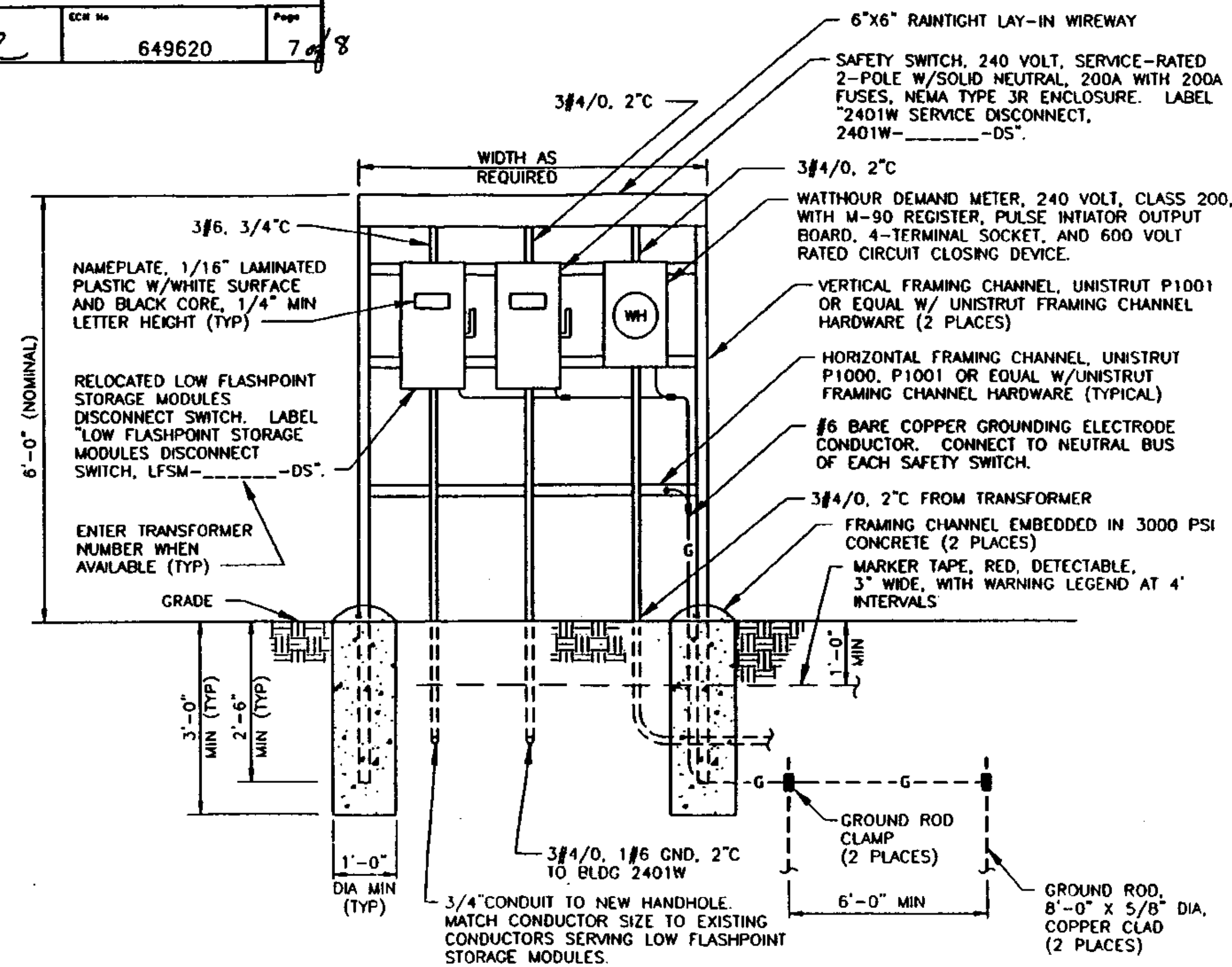
HIGH & LOW VOLTAGE GROUNDING PLAN



H ELEVATION
H-2-80543 NTS

CAD FILE: EC2401CR PLOT SCALE:

FLUOR DANIEL NORTHWEST, INC.				ENGINEERING CHANGE NOTICE SKETCH		
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80544	2	1	RK NEWHOUSE	C. Lle	649620	7 of 8

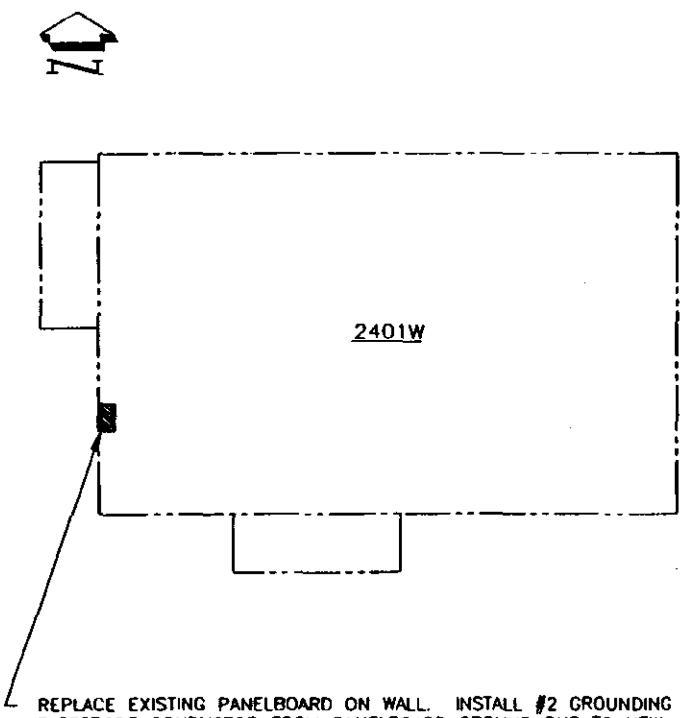


2 DETAIL – DISC RACK

NTS

CAD FILE: EC2401DR PLOT SCALE:

FLUOR DANIEL NORTHWEST, INC.	ENGINEERING CHANGE NOTICE SKETCH					
Ref Dwg	Sh	Rev	Prepared By	Checked By	ECN No	Page
H-2-80544	1	7	RK NEWHOUSE	[signature]	649620	8 18



REPLACE EXISTING PANELBOARD ON WALL. INSTALL #2 GROUNDING ELECTRODE CONDUCTOR FROM PANELBOARD GROUND BUS TO NEW 8' GROUND ROD. ALSO PROVIDE CONNECTION TO EXISTING GROUND ROD AND BUILDING STEEL USING IRREVERSIBLE COMPRESSION CONNECTORS. RECONNECT ALL CIRCUITS AS SHOWN IN PANELBOARD SCHEDULE.

PANELBOARD A LOCATION 2401W VOLTS 120/240 VAC 1PH, 3W
MFG & TYPE ______ CKT BRKR TYPE ______
POWER SUPPLIED FROM ______
NEMA TYPE ENCL 1
■ SURFACE MOUNTED
□ FLUSH MOUNTED
■ MAIN CKT BRKR
□ MAIN LUGS ONLY
■ TOP □ BOT
□ PANELBOARD GROUND FAULT PROTECTION
■ GROUND BUS
225 AMP BUS
225 AMP NEUT

SERVICE	KVA	NO.	A 200A	B	NO.	KVA	SERVICE
WEST LIGHTS	1440	1	20A	20A	2	360	NE AIR SAMPLER RCPTS
EAST LIGHTS	1440	3	20A	20A	4	750	FIRE RISER RM BASE BD HTR
ENCL, EXT & LIGHTING	340	5	20A	20A	6	500	FIRE RISER RM AIR CPRSR
SW RECEPTACLES	360	7	20A	20A	8	830	NE EXHAUST FAN
BACKFLOW BLDG HTR	2000	9	20A	20A	12	480	BACKFLOW BLDG LTG & RCPT
SW EXHAUST FAN	360	13	20A	20A	14	110	EAST OUTSIDE LIGHTS
				20A	16		SPARE
NORTH WALL RCPTS	720	17	20A	20A	18	540	EAST OUTSIDE RCPTS
SW AIR SAMPLER RCPTS	360	19	20A	20A	20		SPARE
SPACE		21			22		SPACE
SPACE		23			24		SPACE
SPACE		25			26		SPACE
SPACE		27			28		SPACE
SPACE		29			30		SPACE
SPACE		31			32		SPACE
SPACE		33			34		SPACE
SPACE		35			36		SPACE
SPACE		37			38		SPACE
SPACE		39			40		SPACE
SPACE		41			42		SPACE

PANELBOARD SCHEDULE

CAD FILE: EC2401ER PLOT SCALE:

5

ENGINEERING CHANGE NOTICE

1. ECN 637479

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [X] Direct Revision [] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	RW Whitlock/32A40/T4-03/ 373-1737	[] Yes [X] No	5/5/98
	6. Project Title/No./Work Order No. Central Waste Complex KA26782-T03	7. Bldg./Sys./Fac. No. CWC	8. Approval Designator N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) see block 13	10. Related ECN No(s). 623646 & 637480	11. Related PO No. N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change — 13b. Design Baseline Document? [X] Yes [] No

See page 3 of this ecn.

14a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

Drawings on the essential and support drawing list have been re-evaluated. The support drawings were determined to be essential drawings per HNF-PRO-242.

15. Distribution (include name, MSIN, and no. of copies)

RW Whitlock T4-03 (1)
File T4-03 (1)
~~CB Sacco T4-03 (1)~~ ew 8/24/98
BJ Graf T4-55 (1)
RF Boolen T4-03 (1)
FD Sargent T4-03 (1)

RELEASE STAMP

DATE: SEP 14 1998

STA: 5

HANFORD RELEASE

ID: 12

A-7900-013-2 (05/96) GEF095

A-7900-013-1

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 637479

16. Design Verification Required	17. Cost Impact								18. Schedule Impact (days)		
	ENGINEERING				CONSTRUCTION						
[] Yes	Additional	[]	$		Additional	[]	$		Improvement	[]	
[X] No	Savings	[]	$	N/A	Savings	[]	$		Delay	[]	N/A

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
WHC-SD-WM-TI-404 REV. 4 (This is changed simultaneously by ECN 637480.)		

21. Approvals

	Signature	Date		Signature	Date
Design Authority	RR AMES	5/6/98	Design Agent		
Cog. Eng.	RW WHITLOCK	5/5/98	PE		
Cog. Mgr.	JR Rosser	5/6/98	QA		
QA			Safety		
Safety			Design		
Environ.			Environ.		
Other			Other		

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

ECN 637479

Date

Change the drawing status as follows:

~~H-2-80544 sht 1 rev. 6 to ESSENTIAL~~ RWW per telecon 9/14/98 dmp
H-2-80743 sht 1 rev. 5 to ESSENTIAL
H-2-80743 sht 2 rev. 1 to ESSENTIAL
H-2-80743 sht 3 rev. 1 to ESSENTIAL
H-2-80923 sht 1 rev. 6 to ESSENTIAL
H-2-80924 sht 1 rev. 6 to ESSENTIAL
H-2-80925 sht 1 rev. 6 to ESSENTIAL
~~H-2-131547 sht 1 rev. 5 to ESSENTIAL~~
~~H-2-131547 sht 2 rev. 2 to ESSENTIAL~~ RWW per telecon 9/14/98 dmp
H-2-823233 sht 1 rev. 1 to ESSENTIAL
H-2-823233 sht 2 rev. 0 to ESSENTIAL
H-2-823234 sht 1 rev. 1 to ESSENTIAL
H-2-72500 sht 1 rev. 1 to ESSENTIAL

H-2-80606 sht 1 rev. 2 to SUPPORT
H-2-80606 sht 2 rev. 1 to SUPPORT
H-2-80739 sht 1 rev. 2 to SUPPORT
H-2-72499 sht 1 rev. 1 to SUPPORT
H-2-72499 sht 2 rev. 0 to SUPPORT

~~H-2-72501 sht 1 rev. 2 to GENERAL~~
~~H-2-72501 sht 2 rev. 2 to GENERAL~~ RWW per telecon 9/14/98 dmp

APPENDIX 4B

SECONDARY CONTAINMENT CALCULATIONS

APPENDIX 4B

SECONDARY CONTAINMENT CALCULATIONS

Flammable and Alkali Metal Waste Storage Modules

The Flammable and Alkali Metal Waste Storage Modules have secondary containment (spill containment) ranging from 1,500 to 7,600 liters, depending on the manufacturer. Inspection aisle space of 76 centimeters or greater is required. Stacking of containers larger than 208-liters is not allowed.

As discussed in Chapter 4.0, Section 4.1.1.1, any liquid must be packed with material capable of absorbing twice the volume of the liquid in the same container. The maximum amount of properly stored liquid in a 208-liter container is 57 liters.

Under these conditions, it is considered improbable to exceed the retention capacity of the secondary containment (sump) in any storage module. Manufacturer and containment capacity for each storage module are listed as follows.

Flammable Waste (FW) and Alkali Metal Waste (AMW) Storage Modules:

Module no.	Length (meters)	x	Width (meters)	x	Sump depth (meters)	=	Secondary containment (liters)
AMW-1	7.6		2.7		0.13		2,700
AMW-2	7.5		3.0		0.15		3,400
AMW-3	7.7		2.7		0.13		2,700
AMW-4	7.5		3.0		0.15		3,400
FW-01	6.6		2.3		0.13		2,000
FW-02	6.6		2.3		0.13		2,000
FW-03	10.3		3.7		0.20		7,600
FW-04	4.8		3.8		0.18		3,300
FW-05	7.4		2.6		0.18		3,500
FW-06	7.4		2.6		0.18		3,500
FW-07	7.4		2.6		0.18		3,500
FW-08	4.8		3.8		0.18		3,300
FW-09	7.4		2.6		0.18		3,500
FW-10	7.4		2.6		0.18		3,500
FW-11	7.4		2.6		0.18		3,500
FW-12	7.4		2.6		0.18		3,500

Module no.	Length (meters)	x	Width (meters)	x	Sump depth (meters)	=	Secondary containment (liters)
FW-13	4.8		3.8		0.18		3,300
FW-14	10.3		3.7		0.20		7,600
FW-15	7.4		2.6		0.18		3,500
FW-16	7.5		3.1		0.18		4,200
FW-17	7.5		3.1		0.18		4,200
FW-18	7.5		3.1		0.18		4,200
FW-19	7.0		2.6		0.18		3,300
FW-20	7.0		2.6		0.18		3,300
FW-21	7.7		2.7		0.15		3,100
FW-22	7.7		2.7		0.15		3,100
FW-23	7.7		2.7		0.15		3,100
FW-24	7.7		2.7		0.15		3,100
FW-25	7.7		2.7		0.15		3,100
FW-26	7.6		1.3		0.15		1,500
FW-27	7.6		1.3		0.15		1,500

Waste Storage Buildings (2401-W, 2402-W, and 2402-WB through 2402-WL)

The 2401-W and 2402-W Waste Storage Buildings (2402-W and 2402-WB through 2402-WL) all have the same square footage and all have a 15.2-centimeter-high curb for secondary containment. The containment capacity is determined by the capacity of the curbed volume minus a ramp volume, calculated as follows:

Curb volume = 24.2 m x 15.0 m x 0.15 m = 54.4 m^3

Ramp volume = 2[{.5 x (7.17 m x 2.44 m x 0.15 m)}
+ (7.17 m x 0.714 m x 0.15 m)] = 4.2 m^3

Total volume = 54.4 m^3 - 4.2 m^3 = 50.2 m^3 = 50,200 liters.

2403-WA through WC Waste Storage Buildings

The 2403-WA through WC Waste Storage Buildings are 51.8 meters wide and 61 meters long and are divided into four quadrants. Each quadrant is divided by approximately 12.7-centimeter-high concrete curbs that slope toward a sump. The following calculations are for the secondary containment system:

Volume of containment = volume of floor + volume of sump

Volume of floor =

{[11.3 m x 0.13 m x 1/2] + [11.3 m x 0.10 m x 1/2] +
[13.1 m x 0.025 m]}28.8 m = 46.8 m^3

Volume of sump = (0.61 m x 0.61 m x 0.46 m) = 0.17 m^3

Total for quadrant = 46.8 m^3 + 0.2 m^3 = 47.0 m^3

Secondary containment capacity for one quadrant = 47,000 liters

Total secondary containment for the 2403-WA, 2403-WB, or 2403-WC =
4 x 47,000 liters = 188,000 liters.

2403-WD Waste Storage Building

The 2403-WD Waste Storage Building is 51.8 meters wide and 99.1 meters long and is divided into four quadrants. Each quadrant is divided by approximately 12.7-centimeter-high concrete curbs that slope towards a sump. The following calculations are for the secondary containment system:

Volume of floor =

{[11.3 m x 0.13 m x 1/2] + [11.3 m x 0.10 m x 1/2] +
[13.1 m x 0.025 m]} 47.8 m = 77.8 m^3.

Volume of sump = (0.61 m x 0.61 m x 0.46 m) = 0.17 m^3

Total for quadrant = 77.8 m^3 + 0.2 m^3 = 78.0 m^3

Secondary containment capacity for one quadrant = 78,000 liters

Total secondary containment for the 2403-WD = 4 x 78,000 liters = 312,000 liters.

2404-W Waste Storage Buildings

The 2403-W Waste Storage Buildings are 36.6 meters wide and 54.9 meters long and are divided into two equal sections. Each section is surrounded by 15.2-centimeter high concrete curbs that slope toward a central sump. The following calculations are for the secondary containment system.

Volume of containment = volume of curb + volume of sloping floor + volume of sump.

Volume of curb = (36.3 m x 27.3 m x 0.15 m) = 148.6 m^3

Volume of sloping floor =

{[36.3 m x 27.3 m] + [0.61 m x 0.61 m]} / 2 x 0.14 m = 69.4 m^3

Volume of sump = (0.61 m x 0.61 m x 0.61 m) = 0.23 m^3

Total for section = 148.6 m^3 + 69.4 m^3 + 0.2 m^3 = 218 m^3

Secondary containment capacity for one section = 218,000 liters

Total secondary containment for the 2404-WA, 2404-WB, or 2404-WC = 2 x 218,000 liters = 436,000 liters.

Waste Storage Pad

The Waste Storage Pad is 27 meters wide by 30 meters long and is curbed with 15.2 centimeters of concrete. The pad slopes 14 centimeters to a center trench running the length of the pad. The following calculations are for the secondary containment system.

Total volume = volume from curbs + volume from trench

Volume from curbs = {(27 m x 0.15 m) + (27 m x 0.14 m x 0.5)} x 30.2 m = 179 m^3

Volume of trench = 0.30 m x 0.41 m x 30.2 m = 3.7 m^3

Total volume = 179 m^3 + 4 m^3 = 183 m^3 = 183,000 liters.

Rainfall Calculations

A maximum 25-year 24-hour rainfall event will produce less than 5 centimeters of rain in a 24-hour period. The following calculations demonstrate that the Waste Storage Pad secondary containment system is capable of holding the volume of liquid produced by this type of precipitation event.

Area of Waste Storage Pad = 27 m x 30.2 m = 815 m^2

Volume of rain = 815 m^2 x 0.05 m = 41 m^3

Volume of rain = 41 m^3 = 41,000 liters

Volume of secondary containment is 183,000 liters; therefore, the secondary containment system is capable of handling a 25-year/24-hour rainfall event.

APPENDIX 4C

SEALANT PROPERTIES

Steelcote Manufacturing Co.

CORROSION RESISTANT COATINGS

STEELCOTE MANUFACTURING COMPANY
ONE STEELCOTE SQUARE
ST. LOUIS, MO. 63103-8880
(314) 771-8053
FAX (314) 771-7581

August 1, 1996

FAX COVER LETTER

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME:	PATRICK LEEWENS
FIRM:	LEWEENS CORPORATION
FAX NUMBER:	206-842-7699
NAME:	GREG S. NIEDT
RE:	CONTRACT NO. KH-5507 (W-112) ICF KAISER LTR 7/31/96 TO GARCO

TOTAL NUMBER OF PAGES INCLUDING THIS PAGE: 3

IF YOU DO NOT RECEIVE ALL OF THE PAGES, PLEASE CALL US BACK AS SOON AS POSSIBLE AT 314-771-8053. THANK YOU.
****

DEAR PAT:

ACKNOWLEDGING YOUR FAX OF 7-31-96. THE PRODUCT DATA SHEET ATTACHED SHOWS TEMPERATURE LIMITATIONS THAT WE SUGGEST FOR USE OF THE COLORTOP BOTH LOW AND HIGH. THESE ARE GUIDELINES FOR UNSKILLED APPLICATORS WHO MAY NOT HAVE THE NECESSARY SKILLS TO WORK WITH THE PRODUCT. THEY ARE DESIGNED TO PREVENT CRATERS OR GAS BUBBLING AND/OR PREMATURE HARDENING WITHOUT LAYING OUT PROPERLY. THE IMPORTANT THING IS THAT THE PRODUCT SELF-LEVELS AND HARDENS PROPERLY. SKILLED APPLICATORS CAN INSTALL AND PROPERLY CURE THE PRODUCT OFTEN WITHOUT THE NECESSITY OF THESE RESTRICTIONS.

TILE-X 3000 CONTAINS A THIXOTROPE TO HOLD ON VERTICAL SURFACES. AEROSIL IS A COMMON THIXATROPE. THEREFORE WHEN INCLUDED IN COLORTOP IT WILL HOLD ON A LIMITED HEIGHT OF VERTICAL SURFACE SUCH AS CURBS AND COVE BASES. WE SUGGEST ONLY ENOUGH TO HOLD COLORTOP AT THE DESIRED THICKNESS.

WE THINK WALL-NU IS EASIER TO USE BUT YOU MAY SUBSTITUTE COLORTOP MIXED WITH AEROSOL TO REPLACE AMERON 114A WHICH CONTAINS A SIMILAR THIXATROPE (SILICON DIOXIDE) FOR PATCHING PURPOSES.

SINCERELY,

STEELCOTE MANUFACTURING COMPANY

Greg Niedt

GREG S. NIEDT
VICE PRESIDENT, SALES/MARKETING

GSN:fr

ENCLOSURE: PRODUCT DATA SHEET - COLORTOP

CC: FRANK ETTER 509-535-1384
J. J. TORTORICI 509-373-6259

Leewens Corporation
P.O. BOX 10029
BAINBRIDGE ISLAND, WASHINGTON 98110
PHONE (206) 842-7661 FAX (206) 842-7699

7/31/96

Jay Buck
Garco Construction
On Site 200 West
Hanford Nuclear Reservation
Richland, WA 99352
Via Fax (509) 373-6259

Dear Jay:

RE: Thickness of Special Coatings

Each day we will keep a log of square footages coated and materials used within that area. This, in addition to invoices and total square footage at the end of the job will ensure that the correct amount of material is used to achieve 50 mil thickness. This as well as our approved application procedure will be used to determine that we have obtained 50 mil thickness.

The formula is as follows:

> 1600 mil square feet per gallon X number of gallons used ÷ by square feet = Millage of material used.

In addition to this the amount of material used as a base coat will expand by 200-250%. As a minimum therefore, we can add the millage used as the base coat twice, so this needs to be added in once again. Therefore, the millage used as the basecoat X 2 + millage used for the topcoat = final finished thickness.

Also, please refer to approved application procedures. Thank you.

Sincerely,

for Patrick F. Leewens

Patrick F. Leewens
PFL/tml

LEEWENS CORPORATION

P.O. Box 10029
Bainbridge Island, WA 98110
(206) 842-7661
Fax: (206) 842-7699

July 18, 1996

Jay Buck
Garco Construction
Via Fax (509) 373-6259

Dear Jay,

Re. W112 Enhanced Radioactive and Mixed Waste Storage
200 West Area
Richland, WA 99352
Garco Project #9555

Here is our application procedure for the special floor coating:

1. Prepare surface of floor by steelshotblasting.
2. Apply Steelcote Monomid Primer by roller, at rate sufficient to saturate surface of concrete but not leave puddles or dry spots.
3. Fill cracks and holes with Steelcote Wall-Nu or Colortop mixed with thixotrope.
4. Apply Colortop basecoat at 15-20 mils by cerrated squeegee and broadcast to excess with 16/36 Green Diamond aggregate. Allow to cure.
5. Remove excess aggregate. Apply 15 mil Colortop topcoat by flat blade squeegee and backroll.

Total system thickness is 50 mils with nonskid finish per approved sample mockup.

Please let me know if I can answer any additional questions.

Sincerely,

Patrick F. Leewens
PFL/francis

Steelcote® Manufacturing Co.

CORROSION RESISTANT COATINGS

STEELCOTE MANUFACTURING COMPANY
ONE STEELCOTE SQUARE
ST. LOUIS, MO. 63103-0000
(314) 771-8000
FAX (314) 771-7581

September 17, 1992

Mr. Patrick Leewens
Leewens Engineering
255 169th Avenue NE
Bellevue, WA 98008

To Whom It May Concern:

Leewens Engineering is certified as a competent applicator of the following Steelcote Products: Wall-Nu, Colortop, Epo-Lux 121, and related Steelcote Products. This certification is given to include Leewens present application personnel. Such endorsement by Steelcote does not relieve Leewens and their personnel from following all directions on manufacturers printed literature, including applicable Product Data Sheets. Any approved deviation from such instructions shall be confirmed in writing by an officer of Steelcote.

Sincerely,

STEELCOTE MANUFACTURING COMPANY

Douglas A. Niedt

Douglas A. Niedt, President
N.A.C.E. Corrosion Specialist #768

DAN:fr

LETTERS\LEEWENS

Steelcote Manufacturing Co.

ENGINEERING SERVICE

PDS No.0428
MONOMID
CLEAR SEALER

ONE STEELCOTE SQUARE • ST. LOUIS, MO 63103-2880 • (314) 771-8053 • FAX (314) 771-7581

SELECTION DATA

GENERIC TYPE: Waterborne Adduct Cured Epoxy

PRODUCT DESCRIPTION: Monomid is a two-component, water borne, epoxy sealer designed to seal and deeply penetrate concrete or masonry locking in loose aggregate on top and forming a hard, unpenetratable sub-surface. Monomid Sealer possesses a water-thin viscosity, allowing it to penetrate into concrete as much as 1/4 inch. May be applied on new concrete when surface moisture has dissipated as a combination curing compound and sealer/primer. Monomid sealer does not require etching when installed on "green" concrete. When applied to aged and etched concrete, it may be applied to the damp surface. Monomid Intermediate and Finish may be applied as well. Thereby, downtime is reduced. Monomid Sealer is in compliance with the requirements of U.S. Department of Agriculture for use in food packaging and processing operations. It may be used alone as a sealer or in conjunction with Monomid Intermediate, Monomid Finish, Colortop, or other approved Steelcote systems as a primer. There are no explosion, fire, or pollution hazards and no gassing problems. Monomid has very low application odor.

RECOMMENDED FOR: Used especially in food-processing and packaging plants, clean room, hospitals, and breweries. As a clear, penetrating sealer for concrete or masonry surfaces. Designed to protect concrete against moisture, freeze/thaw cycles, salts, oils, and specific chemicals, helps keep dusting down and aids in the cleanability of floors or walls while increasing the life of the concrete. May be used as a sealer under Monomid and other epoxy or polyurethane coatings for excellent resistance to aircraft hydraulic fluids, gasoline, and oil spillage. This updated formula is excellent for airport hanger and other flooring applications where a low V.O.C. is required. Abrasion resistance is 42.9 mg. (ASTM D4060, CS-17 wheel, 1000 cycles 1 kg. Taber Abraser)

NOT RECOMMENDED FOR: Class I potable water immersion. Do not apply below 40°F and rising to above 50°F.

PHYSICAL PROPERTIES

RESISTANCE TO: (Splash & Spillage)	Acids: Good - Very Good Alkali: Excellent Salts: Very Good Solvent: Good - Excellent Water: Excellent
Aviation Products: (No effect 9 day immersion)	Skydrol LD4 and 500B, Aviation Gas, Dirty Engine Oil, Gasohol
VOLUME SOLIDS:	80% +/- 2%
WEIGHT SOLIDS:	82% +/- 2%
MIX RATIO, WEIGHT:	100 Parts B to 28.7 Parts A
MIX RATIO, VOLUME:	4 Parts B to 1 Part A
FLASH POINT:	> 200°F.
POT LIFE:	Up to 4 hours
SHELF LIFE:	1 Year, Minimum
INDUCTION TIME:	1 Hour
APPLICATION TEMPERATURE:	50° - 90°F. (10° - 32°C.)
THINNER - REDUCTION:	Water
THINNER - CLEAN UP:	Water or Steelcote T-201
SERVICE TEMPERATURE:	250°F. (121°C.) Maximum
GLOSS:	Gloss
COLOR:	Clear
PACKAGING:	1 gal. kits and 5 gal. kits
WEIGHT PER GALLON:	8.65 lbs. (3.9 kg) ± 2%
V.O.C. (Volatile Organic Compound):	.65#/gal, .78 g/l mixed

COVERAGES

THEORETICAL COVERAGE:
460 square feet per gallon at 1 mil DFT (allow for application losses)

RECOMMENDED WET FILM THICKNESS:
6.5 mils (150.5 microns)

RECOMMENDED DRY FILM THICKNESS:
1 - 2 mils (50 microns)

DRYING TIME
@ 77°F. (25°C.) 40% RH

TO TOUCH:	3 Hours
TO RECOAT:	3 - 4 Hours
FINAL CURE:	7 Days

RECOMMENDED FINISHES

CONCRETE FLOORS & MASONRY:
Monomid Semi-Gloss or Gloss, Colortop, BFB, Epo-Floor Top, Self-Priming when used as a clear sealer

SURFACE PREPARATION

CONCRETE OR MASONRY: For proper bonding, apply over a clean, sound surface. For new construction, Monomid may be installed directly to "green" concrete without etching or aging. The only requirement is that the surface temperature be 50°F and rising. All laitance or loose bound concrete should be removed and the surface cleaned leaving a hard, bound substrate preferably by dry abrasive blasting. "Sweep" abrasive blasting is the most effective method of surface preparation. For old concrete, or if dry abrasive blasting is not possible, the concrete may be prepared by acid etching with Steelcote Clean & Etch per label instructions. After etching, neutralize concrete with a solution of two (2) cups aqua ammonia per five (5) gallons of water. Flush clean with water and allow to dry thoroughly. If oil or grease stains exist after etching, clean areas by scrubbing with a solution of Tri-Sodium Phosphate (TSP) and warm water. Flush clean with water and allow to surface dry.

Apply Monomid Clear Sealer per label instructions. Allow one hour induction time after mixing. If Monomid Clear Sealer is to be used as a primer, for best adhesion, apply the appropriate topcoat while the Monomid Clear Sealer is still tacky (normally within ten hours). If the Monomid Clear Sealer is permitted to dry (and topcoating is still desired) and if any "blush" or residue exists on the surface, remove by either wiping with isopropyl alcohol or washing with a solution of Tri-Sodium Phosphate (TSP) and warm water. If washing with TSP solution, flush with water and allow to dry. If no "blush" or residue exists, it is not necessary to clean the surface and primer and topcoat may be applied within 24 hours maximum after application at 77°F, and 40% relative humidity. If more than 24 hours have elapsed between coats, the floor must be solvent worked and sanded dull and vacuumed clean to achieve proper adhesion of subsequent coats. Monomid Semi-Gloss Intermediate Primer should be applied over this sealer if a color topcoat is to be applied in order to avoid "mirror pick-up" of concrete hairline cracks and other imperfections of concrete. Clean all tools and equipment with Steelcote T-201 after use.

NOTE: Do not "puddle" Monomid Clear Sealer on the surface. When used as sealer only, apply at least two coats for best results.

APPLICATION EQUIPMENT

BRUSH: Use a clean, nylon bristle brush. No reduction necessary.

ROLL: Use a clean, short nap, mohair roller with a phenolic core. No reduction necessary.

OTHER: On smooth concrete, may be applied by E-Z Paintr® Flat Applicator.

CONVENTIONAL SPRAY

Gun:		Binks 18 or equal
Fluid Nozzle:		68
Air Nozzle:		68 PB
Air Hose ID:		1/4"
Material Hose ID:		3/8"
Needle:		68
Pressure:	Pot:	10 - 15 psi
	Atomization:	30 - 45 psi

Use moisture and oil traps.
No reduction necessary.

AIRLESS SPRAY

Pump Ratio:	28:1
Gun:	Graco 208-327 or equal
Tip Size:	0.017 - 0.019
Fan Size:	6" - 8"
Pressure:	2000 - 2500 psi
Material Hose ID:	1/4"

No reduction necessary.

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LIMITED WARRANTY: The information presented herein is, to the best of our knowledge, true and accurate. No warranty or guarantee, express or implied, is made regarding the ...nance or stability of any product since the manner of use and condition of storage and handling are beyond our control. Our liability in supplying these products is limited to replacement of any product found to be defective. THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IM... OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, CONSTITUTES THE ONLY WARRANTY MADE BY THE MANUFACTURER OF FITNESS OR MERCHANTABILITY, AND THERE ARE NO OTHER GUARANTEES OR WARRANTIES, EXPRESS OR IMPLIED, IN FACT OR BY LAW. No suggestion for product use, nor anything contained herein, shall be construed as a recommendation for its use in infringement of any existing Patent.

The information contained herein is based upon data found by our own, or independent testing laboratory. It is considered accurate at the date of issuance, and is subject to change without notice.

Steelcote® Manufacturing Co. ENGINEERING SERVICE

PDS No. 0427

MONOMID EPOXY HI-BUILD

ONE STEELCOTE SQUARE • ST. LOUIS, MO 63103-2880 • (314) 771-8053 • FAX (314) 771-7581

SELECTION DATA

GENERIC TYPE: Waterborne Adduct Cured Epoxy

PRODUCT DESCRIPTION: Monomid is a very tough, durable, water reducible epoxy coating designed for use in areas where an attractive, easily cleanable, high-gloss or semi-gloss finish is desired. Formulated with water reducible epoxy resins, Monomid complies with FDA Title 21, Section 175.300 for use in food processing and packaging facilities and is U.S.D.A. approved for incidental food contact. Formulated for spray, brush or roll application, it possesses excellent flow and leveling and dries to an abrasion-resistant, tile-like finish. Monomid is water-thinned and has easy water clean-up. No explosion, fire, or pollution hazard and no gassing problems. Monomid has very low odor and wide custom color availability. Monomid Hi Build Semi-Gloss may be used as a finish coat or as an intermediate coat over Monomid Clear Sealer for finishing floors subject to chemical exposures as well as heavy traffic.

RECOMMENDED FOR: Application for use on walls, ceilings, concrete floors, equipment and structural steel especially in food-processing and packaging plants, clean room, hospitals, and breweries. This updated formula is excellent for airport hanger and other flooring applications where a low V.O.C. is required. Abrasion resistance is 42.9 mg. (ASTM D4060, CS-17 wheel, 1000 cycles 1 kg. Taber Abraser)

NOT RECOMMENDED FOR: Class I potable water immersion. Do not apply below 40°F and rising to 50°F. Exterior use without chalk resistant topcoat if dull apppearance is objectionable.

PHYSICAL PROPERTIES

RESISTANCE TO: (Splash & Spillage)	Acids:	Good to Very Good
	Alkali:	Excellent
	Salts:	Very Good
	Solvent:	Good to Excellent
	Water:	Excellent
Aviation Products: (No effect 9 day immersion)		Skydrol LD4 and 500B; Aviation Gas, Dirty Engine Oil, Gasohol
VOLUME SOLIDS:		Semi-Gloss: 46% +/- 2%
WEIGHT SOLIDS:		Semi-Gloss:65%+/-2%
MIX RATIO, WEIGHT:		100 Pts.B : 17.27 Pts.A
MIX RATIO, VOLUME:		4 Pts.B to 1 Pt.A
FLASH POINT:		> 200°F.
APPLICATION LIFE:		Up to 4 Hours
SHELF LIFE:		1 Year, Minimum
INDUCTION TIME:		60 Minutes
THINNER - REDUCTION:		Water
THINNER - CLEAN UP:		Water or Steelcote T-201
APPLICATION TEMP:		50°-90°F. (10°-32°C.)
SERVICE TEMP:		250°F. (121°C.) Max.
GLOSS:		Hi-Build Semi-Gloss
COLOR:		White
PACKAGING:		1 gal. & 5 gal. kits
WEIGHT PER GAL:		12.39 lbs.(5.6 kg) ± 2%
V.O.C. (Volatile Organic compound)		.77#/gal., 92 g/l

COVERAGES

THEORETICAL COVERAGE:
147 square feet per gallon at 5 mils DFT (allow for application losses)

RECOMMENDED WET FILM THICKNESS:
11 mils (275 microns)

RECOMMENDED DRY FILM THICKNESS:
Hi-Build Semi-Gloss: 5 mils (125 microns)

DRYING TIME

@ 77°F. (25°C.) 40% RH

TO TOUCH:	3 Hours
TO RECOAT:	3 - 4 Hours
FINAL CURE:	7 Days

RECOMMENDED PRIMERS

TO STEEL: Monomid Metal Primer or Speedepoxy

TO CONCRETE FLOORS:
Monomid Clear Sealer or Monomid Hi-Build Semi-Gloss

TO CONCRETE BLOCK WALLS:
Self priming. Fill with two coats Cortite Block Filler or Wall-Nu

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SURFACE PREPARATION

CONCRETE OR MASONRY: For proper bonding, apply over a clean, dry, sound surface. For new construction, allow the concrete to cure a minimum of twenty-eight (28) days at 60°F. before coating. Concrete should have a maximum moisture content of ten (10) percent. All laitance or loose bound concrete should be removed and the surface cleaned leaving a hard, bound substrate preferably by dry abrasive blasting. "Sweep" abrasive blasting is the most effective method of surface preparation. For old concrete, or if dry abrasive blasting is not possible, the concrete may be prepared by acid etching with Steelcote Clean & Etch per label instructions. After etching, neutralize concrete with a solution of two (2) cups aqua ammonia per five (5) gallons of water. Flush clean with water and allow to dry thoroughly. If oil or grease stains exist after etching, clean areas by scrubbing with a solution of Tri-Sodium Phosphate (TSP) and warm water. Flush clean with water and allow to dry thoroughly.

Apply Monomid Clear Sealer per label instructions. Allow one hour induction time after mixing. If Monomid Clear Sealer is to be used as a primer, for best adhesion, apply the appropriate topcoat while the Monomid Clear Sealer is still tacky (normally within ten hours). If the Monomid Clear Sealer is permitted to dry (and topcoating is still desired) and if any "blush" or residue exists on the surface, remove by either wiping with isopropyl alcohol or washing with a solution of Tri-Sodium Phosphate (TSP) and warm water. If washing with TSP solution, flush with water and allow to dry. If no "blush" or residue exists, it is not necessary to clean the surface and primer and topcoat may be applied within 24 hours maximum after application at 77°F, and 40% relative humidity. If more than 24 hours have elapsed between coats, the floor must be solvent washed, sanded dull, and vacuumed clean to achieve proper adhesion of subsequent coats. Monomid Hi-Build Semi-Gloss Intermediate Primer should be applied over this sealer if a topcoat is to be applied in order to avoid "mirror pick-up" of concrete hairline cracks and other small imperfections of concrete. Clean all tools and equipment with Steelcote T-201 after use.

NOTE: Do not "puddle" Monomid Clear Sealer on the surface. When used as sealer only, apply at least two coats for best results.

TO STEEL: Surface must be clean and free from oil, grease, wax, loose rust, and foreign matter. Surface should be degreased by solvent wiping with Steelcote T-181 in accordance with SSPC-SP1 specification. Remove any existing loose rust, mill scale, or foreign matter by hand or power tool cleaning in accordance with SSPC-SP2 or SSPC-SP3 specification. For more severe environments, surface should be dry abrasive blasted to a commercial finish (SSPC-SP6 specification). If any grease, oil, or wax is present prior to blasting, remove by solvent wiping (SSPC-SP1 specification). Dry abrasive blast in order to remove at least two-thirds (2/3) of all visible rust, mill scale, paint, and other foreign matter from each square inch of surface. Blast to a 1 1/2 - 2 mil profile for proper adhesion. After sandblasting, remove all sand, dust, and grit by sweeping and/or vacuuming. Apply Speedepoxy or other recommended primer per label instructions as soon as possible after sandblasting and always before any flash rusting can occur. Topcoat at the appropriate time with a Steelcote recommended finish coat. Clean all tools and equipment with a Steelcote ...mmended thinner after use.

APPLICATION EQUIPMENT

BRUSH: Use a clean, nylon bristle brush. Reduce with tap water 10-15% as necessary.
ROLL: Use a clean, short nap, mohair roller with a phenolic core. Reduce with tap water 10-15% as necessary.
OTHER: On smooth concrete, may be applied by E-Z Paintr® Flat Applicator.

CONVENTIONAL SPRAY

Gun:		Binks 18 or equal
Fluid Nozzle:		68
Air Nozzle:		66 PB
Air Hose ID:		1/4"
Material Hose ID:		3/8"
Needle:		68
Pressure:	Pot:	10 - 15 psi
	Atomization:	30 - 45 psi

Use moisture and oil traps.
Reduce 10-15% with tap water as necessary.

AIRLESS SPRAY

Pump Ratio:	28:1
Gun:	Graco 208-327 or equal
Tip Size:	0.017 - 0.019
Fan Size:	6" - 8"
Pressure:	2000 - 2500 psi
Material Hose ID:	1/4"

Reduce 10-15% with tap water as necessary.

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Steelcote® Manufacturing Co.

ENGINEERING SERVICE

PDS No. 0787
COLORTOP

ONE STEELCOTE SQUARE • ST. LOUIS, MO 63103-2880 • (314) 771-8053 • FAX (314) 771-7581

SELECTION DATA

GENERIC TYPE: Amine Adduct Cured Epoxy

PRODUCT DESCRIPTION: Steelcote Colortop is a 100% solids resin formulated to have a "Honey-like" viscosity that when mixed and spread on a floor self-levels at 15 - 30 mils. The clear is near water-white in color and forms a very dense, abrasion and early 12-hour mar resistant coating able to tolerate high volume traffic, chemicals, water, and ultra violet exposure with little of no degradation except slight color changes.

RECOMMENDED FOR: Colortop is a highly versatile resin used as a floor coating either clear or pigmented, as a casting resin or as a binder for 3M Colorquartz® and other architectural aggregate such as exposed aggregate walks. Colortop is recommended for concrete, masonry, and wood surfaces with appropriate primers. It has also been used for coating plastics and steel, when properly primed. For exterior application may be top-coated with Steelcote's MCU 3540, Epo-Lux 595, or Epo-Lux 600 Clear to assure chalk resistance and minimize color drift. Write for detailed information for use with large aggregates for exposed aggregate sidewalks, patios, etc., or for use with 3M Colorquartz® aggregates, non-skid aggregates, or for use as a trowel-on flooring.

NOT RECOMMENDED FOR: Do not apply at temperatures below 40°F and rising or above 95° F. Surface temperature may not exceed 75°F.

PHYSICAL PROPERTIES

RESISTANCE TO: (Splash & Spillage)	Acids:	Good - Excellent
	Alkali:	Good - Excellent
	Salts:	Excellent
	Solvent:	Good - Excellent
VOLUME/WEIGHT SOLIDS:		99.8% +/- 1/2% (Trace)
VISCOSITY:		Syrup-Self Leveling
FLASH POINT:		>200°F, (93°C.)
MIX RATIO, WEIGHT:		84.25 Parts A to 100 Parts B
MIX RATIO, VOLUME:		1 Part A to 1 Parts B
POT LIFE:		60°F.30-45 Min. Max./2 Gl Mix 77°F.20-30 Min. Max./2 Gl Mix 95°F. 7-10 Min./2 Gal. Mix
INDUCTION TIME:		None
SHELF LIFE:		2 Years, Minimum
THINNER - REDUCTION:		Diluent A
THINNER - CLEAN UP:		Steelcote T-184
APPLICATION TEMP:		50° - 90°F. (10° - 32°C.)
SERVICE TEMPERATURE:		300°F. (148.8°C.) Dry 180°F. (82.2°F.) Immersion
GLOSS:		High Gloss
COLOR:		Water White Clear & Lt Gray. Other colors on special order
PACKAGING:		2 gal. and 10 gal. units
WEIGHT PER GALLON:		8.89 lbs (3.94 kg) ± 2%
V.O.C. (Volatile Organic Compound):		1 g/l or less

COVERAGES

THEORETICAL COVERAGE: 160 sq. ft. per gal. at 10 mils DFT (Profile of surface preparation causes thickness variations. Allow for application losses)

RECOMMENDED WET FILM THICKNESS: 10 - 32 mils (250 - 800 microns)

RECOMMENDED DRY FILM THICKNESS: 10 - 32 mils (250 - 800 microns)

DRYING TIMES

@ 77°F. (25°C.), 50% RH

TO TOUCH:	2 Hours
TO RECOAT:	4 Hours
FOR TRAFFIC:	6-12 Hours
FINAL CURE:	7 - 12 Days

RECOMMENDED PRIMERS

WOOD: Self priming. Only one coat 8 -15 mils normally sufficient.

CONCRETE: Epo-Lux 121 PS or Monomid Clear Sealer when acid etched with Clean & Etch. Speedepoxy SY-1 White or Monomid High-Build Intermediate over other coatings or silicate hardeners that cannot be removed. Use Wall-Nu to fill holes & cracks. Monomid Clear Sealer has lowest odor and VOC.

TOPCOATS (EXTERIOR OR INTERIOR): Epo-Lux 595; Epo-Lux 600; MCU 3540

SURFACE PREPARATION

CONCRETE: New concrete should be well cured (28 days at 70°F), free of all sealing and hardening compounds, and any other contaminants as oil, grease and chemicals. Old cement shall be clean and free of the same as above plus old coatings and paints. Shot blasting to a 3-5 profile is the recommended method of surface preparation. Acid etching is approved with Steelcote Clean & Etch followed by neutralizing with aqua ammonia in water (2-3 cups per 5 gallons of water). Double etch with Clean & Etch only to 100 mesh sandpaper profile. Do not use muriatic acid solution! Clean & Etch contains proper balance of phosphoric and muriatic acid to etch without damage to floor! Concrete surfaces must be free of hydrostatic pressure. Application may be made to a damp, uncured concrete floor if Monomid Clear Sealer is applied first and allowed to dry. Do not apply over curing agents, hardeners, oil, grease, or other intervening barriers. If applying over Epo-Lux 121 or Monomid Clear Sealer, apply when sealer is slightly tacky to assure chemical bond. If sealer is allowed to dry, sanding is required before application of Colortop. Use Steelcote Wall-Nu to fill holes and cracks. Sand smooth before applying Color-Top.

WOOD AND PLYWOOD: These surfaces shall be clean, free of dirt, oil, grease and other contaminants. Loose boards shall be re-nailed or screwed and counter-sunk. Rot or severe contamination shall be cut out to sound surface and repaired with new wood or filled with Steelcote Color-Top. The surface shall be machine sanded to a smooth, open-pored state. Apply Colortop over Monomid Clear Sealer or Epo-Lux 112 Deep Penetrating Sealer.

STEEL: Consult Steelcote's Technical Service Department.

MIXING AND APPLICATION FOR USE AS A COATING: Do not attempt to mix the material if it has been stored in a cold area for a period of time. The material must be warmed to room temperature(at least 65°F.) so that easier mixing can be obtained. Material can be warmed to 65°F.by sitting in warm water or a warm room for a period of time. Warming the material reduces the viscosity to the proper consistency for thorough mixing and easy application. Do not mix more than one two gallon unit at a time for best results, but if application is being accomplished be more than one person two, two-gallon units may be mixed. Mixing of quantities of one, two-gallon unit or more shall be accomplished on a 30 RPM, "KOL" or equivalent small paste or cement mortar mixer of 5-gallon capacity or more. Mixing with a paddle or jiffy-type mixer or by hand is not recommended except as part of the KOL mixing.. Prestir both components to assure uniform color. Use a perforated blade in the KOL Mixer and mix on the basis of one Part A to one Part B. Mix 3 minutes by the clock blending vertically with the slow speed Jiffy mixer and continuously scraping the sidewalls of the mixing container. At the end of 3 minutes, stop, and transfer the mix to a separate, clean 5-gallon can scraping down the sidewalls and the mixing blade to make sure all material is in the first can, then pour down the center of the second can. Re-mix for one minute.

CONTROLS: To avoid having unmixed or partially mixed batches that can result in uncured wet spots or partially cured "tacky" or soft spots it is necessary to have close mixing checks for each batch. Take a 2 to 3-ounce sample of each mix after completion of mix in a wax cup. Write the time of mix on a tongue depressor placed in each cup. If material in cup does not set up or begin to set up and/or become warm or hot in one hour at 75 degrees Fahrenheit STOP THE APPLICATION. If possible, put the sample in an oven at 120 degrees Fahrenheit for 10-12 minutes. If material does not harden, remove uncured mixed material from surface and re-evaluate mixing procedures. If oven not available, a shallow pie pan filled with hot tap water can be used to accelerate the cure of control specimen. If material is stored and/or shipped at temperatures above 80°F., it be cooled before mixing to avoid a short pot-life.

APPLICATION: Mixed Colortop shall be poured out on floor immediately after mixing in a snake-like fashion to a pre-measured area equal to the desired mil thickness. Spread evenly with a 14" serrated vinyl squeegee and cross-rolled with a 1/8" mohair roller with a phenolic core. A brush may be used as required around edges. Lightly mist surface with Diluent A or roll over "wet" material with a "porcupine" roller to remove air bubbles, if they form. Keep a wet edge and continue job without interruption until completed or completed to a natural breakpoint.

MIXING AND APPLICATION INSTRUCTIONS FOR NON-SLIP OR SEED-IN COLOR-TOP METHOD:
See Engineering Service Technical Bulletin No. CT-SIM.

MIXING AND APPLICATION INSTRUCTIONS FOR TROWEL IN METHOD ON COLOR-TOP SYSTEM:
See Engineering Service Technical Bulletin No. CT-TOM.

PHYSICAL AND CHEMICAL PROPERTIES: See Engineering Service Technical Bulletin No. CTF.

APPLICATION EQUIPMENT

BRUSH: Use a clean, natural bristle brush.

ROLL: Use a clean, short nap, mohair roller with a phenolic core or E-Z Paintr® Flat Applicator. Material should be spread with Steelcote 14" serrated squeegee and then cross rolled or spread with flat polyurethane applicator and porcupine roller.

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Steelcote® Manufacturing Co.

ENGINEERING SERVICE

PDS No. 0764
WALL-NU
TROWELABLE

ONE STEELCOTE SQUARE • ST. LOUIS, MO 63103-2890 • (314) 771-8053 • FAX (314) 771-7581

SELECTION DATA

GENERIC TYPE: Amido Amine-Cured Epoxy Mastic.

PRODUCT DESCRIPTION: Wall-Nu Trowelable is a 100% solids, trowelable mastic material suitable for patching, coving, lining, adhesive bonding, and underlayment for construction, maintenance, and marine use. Wall-Nu Trowelable, once properly cured, creates a very strong bond to a wide variety of substrates including wood, concrete, masonry, metal, fiberglass, and even glass. Applied up to 1" thick on vertical surfaces, it is completely non-shrinking, is non-brittle, and has an expansion coefficient similar to concrete. It dries to a hard, water-tight barrier that may be wet-sanded, drilled, or filed if desired. It resists spillage of many acids and alkalies, and is formulated to perform well in corrosive or elevated temperature exposures. An all purpose mastic epoxy, Wall-Nu Trowelable has been found acceptable by the U.S.D.A. for use as a coating for application to structural surfaces where there is a possibility of incidental food contact in food processing or packaging facilities.

RECOMMENDED FOR: May be used for tuckpointing, leveling, coving, patching and resurfacing. Use to alter walls, floor or ceiling topography in order to obtain a smooth or contoured surface. For use in areas where a chemical, water or corrosion resistant barrier is needed for patching and repairing structural cracks, spalls, swimming pools, tanks and secondary containment areas. Withstands water immersion service up to 180°F.

NOT RECOMMENDED FOR: Do not apply in temperature below 50°F. Do not thin material. Not for use in areas subject to flexing or torsion; see Wall-Nu Flexible.

PHYSICAL PROPERTIES

RESISTANCE TO: (Splash & Spillage)	Acids:	Good
	Alkali:	Excellent
	Salts:	Excellent
	Solvent:	Fair
	Water:	Excellent
VOLUME SOLIDS:		100%
WEIGHT SOLIDS:		100%
MIX RATIO, WEIGHT:		1 Part A to 1 Part B
MIX RATIO, VOLUME:		1 Part A to 1 Part B
FLASH POINT:		>200°F. (93°C.) TCC
POT LIFE:		1 Hour Min. @77°F.(25°C)
SHELF LIFE:		1 Year, Minimum
THINNER - REDUCTION:		Not Recommended
THINNER - CLEAN UP:		Steelcote T-181
APPLICATION TEMPERATURE:		50° - 95°F. (10° - 35°C.)
SERVICE TEMPERATURE:		250°F. (121°C.) Continuous
GLOSS:		Flat
COLOR:		Gray or Off-White
PACKAGING:		1/2, 2 and 10 Gallon Units
WEIGHT PER GALLON:		13.16 lbs(5.98 kg)+/-2%
V.O.C. (Volatile Organic Compound):		0

COVERAGES

THEORETICAL VOLUME COVERAGE:
231 cubic inches per gallon

THEORETICAL AREA COVERAGE:
12.65 sq. ft. per gal. at 1/8" (3,125 microns)
Cove 1" X 1" = 29 linear feet/gallon

MAXIMUM FILM THICKNESS:
1/2" (12,500 microns) per coat without Stop-Flow up to 1" (50,000 microns) vertical with Stop-Flow added. 1"(25,000 microns) for coving.

DRYING TIME
@ 77°F. (25°C.) 50% RH

TO TOUCH:	8 Hours
TO RECOAT:	24 Hours
FOR TRAFFIC:	24 - 48 Hours
FINAL CURE:	7 Days

RECOMMENDED FINISH COATS*

Two-Package Urethane:
Epo-Lux Series Nos. 520, 590, 595 and 600

Epoxy-Polyamide: Epo-Lux Series Nos. 121 and 150

Epoxy-Amine: Epo-Line Series Nos. 161 and 164

* In severe immersion environments, sanding Wall-Nu Trowelable before topcoating is recommended.

SURFACE PREPARATION

CONCRETE OR MASONRY: Allow concrete to cure a minimum of twenty-eight (28) days at 60°F. For proper bonding, apply over a ..n, dry, sound surface. Remove any existing oil, grease, wax, dirt, loose or foreign matter by washing with a solution of Tri-Sodium Phosphate ..P) and warm water. Flush with clean water and allow to dry. Obtain "tooth" and remove any existing laitance on concrete floors by dry abrasive ..sting with 30/40 mesh silica sand or etching with a solution of Steelcote Clean & Etch per label instructions. If etching, neutralize with a solution ..wo (2) cups aqua ammonia per five (5) gallons of water. Flush clean with water and allow to dry thoroughly. For new or clean concrete floors, abrasive blasting or etching alone is adequate. For filling or repairing cracks, spalls, or small holes, etching or sandblasting is not needed. Apply ..l-Nu Trowelable per label instructions. Topcoat at the appropriate time with the Steelcote recommended finish coat. Clean all tools and equipment .. Steelcote T-181 after use.

STEEL: Surface must be clean, dry, sound and free from all oil, grease, wax, loose rust and foreign matter. For steel used in non-immersion ..vice, surface should be degreased by solvent wiping with Steelcote T-181 in accordance with SSPC-SP1 specification. Remove any existing loose ..., mill scale, or foreign matter by hand or power tool cleaning in accordance with SSPC-SP2 or SSPC-SP3 specification.

.. severe environments, surface should be dry abrasive basted to a Commercial finish (SSPC-SP6). If any grease, oil, or wax is present prior to ..sting, remove by solvent wiping (SSPC-SP1). Dry abrasive blast in order to remove at least two-thirds (2/3) of all visible rust, mill scale, paint and ..er foreign matter from each square inch of surface. Blast to a 2-3 mil profile, minimum, for proper adhesion. After sandblasting, remove all sand, ..t and grit by sweeping and/or vacuuming. Apply Wall-Nu Trowelable per label instructions as soon as possible after sandblasting and always ..ore any flash-rusting can occur. Topcoat at the appropriate time with the Steelcote recommended finish coat. Clean all tools and equipment with ..elcote T-181 after use.

..TE: For immersion environments follow the surface preparation procedures outlined for severe environments. However, dry abrasive blast to ..hite or near-white finish in accordance with SSPC-SP5 or SSPC-SP10 specification in order to remove all or at least 95% of all rust, mill scale, ..nt, and other foreign matter from each quare inch of surface. After applying Wall-Nu Trowelable and allowing it to cure, lightly sand the surface ..ore topcoating.

FIBERGLASS: For proper bonding, apply over a clean, dry, sound surface. Remove any existing oil, grease, wax, dirt, loose or foreign ..er by washing with a solution of Tri-Sodium Phosphate (TSP) and warm water. Flush thoroughly with clean water and allow to dry. Abrade ..ace by hand or power sanding using 3/0 abrasive or specified sandpaper in accordance with SSPC-SP2 or SSPC-SP3 specification. Remove .. dust and wipe with Steelcote T-181 or Toluol. Apply Wall-Nu Trowelable per label instructions. Topcoat at the appropriate time with the Steelcote ..ommended finish coat. Clean all tools and equipment with Steelcote T-181 after use.

WOOD: Surface must be clean, dry, sound and free from all oil, grease, wax, moisture, loose and foreign matter. Remove surface deposits ..sap or pitch by scraping, followed by wiping with Steelcote T-181. Sanding with medium grit sandpaper in accordance with SSPC-SP3 ..ecification is recommended. Apply Wall-Nu Trowelable to the surface per label instructions. Wall-Nu Trowelable may be used to repair loose ..ards, gaps and holes in wood. Topcoat at the appropriate time with Steelcote recommended finish coat.

APPLICATION EQUIPMENT

..ROWEL: Use a clean, stainless steel trowel or spatula of the desired shape or dimensions necessary. A flatmixing board is recommended for proper mixing. Steelcote T-212 Trowelling Liquid may be used for finaltrowel finish for easier, faster, and smoother application.

Steelcote® Manufacturing Co.

ENGINEERING SERVICE

PDS No. 0767

TILE-X 3000

ONE STEELCOTE SQUARE • ST. LOUIS, MO 63103-2980 • (314) 771-8053 • FAX (314) 771-7581

SELECTION DATA

GENERIC TYPE: Aliphatic Epoxy - 100% Solids

PRODUCT DESCRIPTION: Tile-X 3000 is a highly specialized coating designed to furnish a dense (vapor permeability .644 $mgs/cm^2/mil$), chemically resistant, color-stable film. It is useful when a particularly color fast, odorless epoxy barrier coating is desired. Tile-X 3000 complies with FDA Title 21, Section 175.300 for use in food processing and packaging facilities. Formulated primarily for spray application, it possesses excellent flow and leveling characteristics and dries to an 8-12 mil abrasion resistant, anti-graffiti, tile-like finish. Unlike conventional epoxies, exterior gloss retention is excellent and approaches the gloss retention of aliphatic urethanes for exterior exposure and is an excellent substitute for polyurethane finishes when application must be made in areas where, during application, high humidities may be encountered. Tile-X 3000 meets all low V.O.C. requirements, and contains no isocyanates or other airborne irritants.

RECOMMENDED FOR: Application for use on walls, ceilings, secondary containment, some floors, equipment, and structural steel especially in food processing and chemical plants. Does not discolor under Mercury vapor lights. Excellent coating for tank exteriors and interiors, and areas where a high gloss, non-yellowing, chalk resistant finish is desired. Excellent for lining large aquariums, swimming pools, or as a marine coating for fiberglass surfaces above and below the water-line.

NOT RECOMMENDED FOR: DO NOT APPLY at air and surface temperatures below 50°F and rising.

PHYSICAL PROPERTIES

RESISTANCE TO: (Splash & Spillage)	Acids: Fair to Very Good
	Alkali: Excellent
	Salts: Excellent
	Solvent: Fair to Excellent
	Water: Excellent
VOLUME SOLIDS:	100% +/- 2%
WEIGHT SOLIDS:	100% +/- 2%
MIX RATIO, WEIGHT:	76.67 Pts B to 100 Pts A
MIX RATIO, VOLUME:	1 Pt B to 1 Pt A
FLASH POINT:	>200°F.-(93.3°C.) TCC
POT LIFE:	2 Hours, Minimum @ 77°F.
SHELF LIFE:	1 Year, Minimum
THINNER - REDUCTION:	Steelcote T-217 up to 20%
THINNER - CLEAN UP:	Steelcote T-217 or T-164
INDUCTION TIME:	30 Minutes Minimum
APPLICATION TEMPERATURE:	50° - 90°F. (10° - 32°C.)
SERVICE TEMPERATURE:	350°F. (177°C.) Max. (Dry)
GLOSS:	High Gloss
COLOR:	White or to-order
PACKAGING:	2 gal. and 10 gal. units
WEIGHT PER GALLON:	10.6 lbs. (4.82 kg) ± 2%
V.O.C. (Volatile Organic Compound):	0#/gal, 0 g/l 1.37#/gal, 164 g/l ml

COVERAGES

THEORETICAL COVERAGE:
160 square feet per gallon at 10 mils DFT (allow for application losses)

RECOMMENDED WET FILM THICKNESS:
8-12 mils (200-300 microns)

RECOMMENDED DRY FILM THICKNESS:
8-12 mils (200-300 microns)

DRYING TIME

@ 77°F. (25°C.) 50% RH

TO TOUCH:	8 - 10 Hours
TO RECOAT:	18 Hours unthinned 24 Hours thinned
FINAL CURE:	7 Days Non-Immersion 14 Days-Immersion

RECOMMENDED PRIMERS

TO STEEL: Epo-Lux 121 E-14G, Steelmastic 168, Epo-Lux 166, Speedepoxy, Monomid Metal Primer

TO GALVANIZED: MCU 2100 Type VIII, Speedepoxy with Add-A-Lume

TO MASONRY: Monomid Sealer or Hi-Build Intermediate, Epo-Lux 121 PS, Speedepoxy, Epo-Lux 150, Corite Primer, or Wall-Nu Brushable, or Trowelable (as block filler or repair)

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SURFACE PREPARATION

TO STEEL: *Surface preparation will vary widely with the exposure conditions. Minimum requirements shall be: remove any grease, oil, dirt, or* surface contaminants by solvent wiping with T-217 in accordance with SSPC-SP1 specification. Hand or power tool clean in accordance with SSPC-SP2 or SSPC-SP3 specification in order to remove any loose rust or scale. Apply one of the Steelcote recommended primers per label instructions to the clean, dry steel. Topcoat at the appropriate time with Tile-X 3000 per label instructions.

For severe environments: sandblast to a Commercial finish in accordance with SSPC-SP6 specification in order to obtain a clean, dry, sound substrate. For immersion, sandblast in accordance with SSPC-SP-10 specifications. Obtain a sandblast profile of approximately 25% that of the expected coating system thickness. Apply one of the Steelcote recommended primers per label instructions. Topcoat at the appropriate time with Tile-X 3000 per label instructions. Clean all tools and equipment with Steelcote T-217 after use.

TO GALVANIZED: Surface must be clean, dry, sound and free from oil, grease, wax, and foreign matter. Degrease by solvent wiping in accordance with SSPC-SP1 specification. For white rust or weathered galvanized steel, prepare by degreasing and hand or power tool clean in accordance with SSPC-SP2 or SSPC-SP3 specification in order to remove any loose rust or scale. Apply the Steelcote recommended primer per label instructions. Topcoat at the appropriate time with Tile-X 3000 per label instructions. Clean all tools and equipment with Steelcote T-217 after use.

TO MASONRY: Surface must be clean, dry, sound and free from oil, grease, wax, and foreign matter. Clean by washing with a solution of Tri-Sodium Phosphate (TSP) and warm water or high pressure water blasting. Allow to dry. For porous cinderblock, apply Steelcote Corite or Wall-Nu Block filler per label instructions and allow to dry. For immersion, sandblast to remove intervening barriers such as laitance, old paint, etc., and prime with Steelcote Monomid Clear Sealer or Monomid High Build Intermediate. per label instructions. Follow with two coats of Tile-X 3000, not less than 5 mils per coat. Topcoat at the appropriate time with Tile-X 3000 per label instructions. Clean all tools and equipment with Steelcote T-217 after use.

MIXING & APPLICATION

MIXING AND APPLICATION: *Do not attempt to mix the material if it has been stored in a cold area for a period of time.* **The material should be warmed thoroughly to room temperature (at least 65°F) so that easier mixing and application can be obtained. Material can be warmed by setting** the open cans in hot water or in a warm room before use. Warming the material reduces the viscosity to the proper consistency for easy application and thorough mixing. Do not mix more than a two gallon unit at any one time if application cannot be accomplished within the pot life limitations for best results. Mixing of quantities of two (2) gallons or more of Tile-X 3000 must be accomplished with an a 30 R.P.M. electric "KOL" or equivalent small paste or cement mixer of five (5) gallon or more capacity. Mixing with paddle or jiffy-type electric mixers or by hand is unacceptable except for mixes of less than two gallons, or as described next. Pre-stirring of Part "A" activator and Part "B" Base may be accomplished by hand stirring of each part. Power mixing on the KOL Mixer with a <u>perforated-type mixing blade</u> of Parts "A" and "B" in proper ratio shall be three (3) minutes by the clock. mix vertically with a slow speed Jiffy Mixer to achieve shear action. Mix shall then be transferred to a second clean five gallon pail scraping sidewalls and mixing blade of the first container and pouring into the center of the second container. Re-mix in the second container for one minute. To thin the material for spray application, up to 20% of T-217 may be added, but then coverage is reduced to ten mils per coat and the drying interval increases to 24 hours between coats to allow for solvent release. When mixing is complete, allow material to induct for 30 minutes. Apply over one of the primers mentioned on the previous page.

BRUSH: A clean, natural bristle brush is suitable for small areas. Reduce up to 5% with Steelcote T-217 if necessary.

ROLL: Use a short nap, mohair roller with a phenolic core. Smooth as necessary with E-Z Paintr flat applicator. Reduce with Steelcote T-217, if necessary, up to 5%.

CONVENTIONAL SPRAY

Not Recommended

AIRLESS SPRAY

Pump Ratio:	45:1
Gun:	Bulldog or President 206-718
Tip Size:	Reverse-A-Clean 417
Fan Size:	6" - 8"
Pressure:	2500 psi
Material Hose ID:	1/2" to 50 feet to 3/8" whip 8-12 feet

Reduce up to 20% with Steelcote T-217, if necessary.
Do not use ketone solvents!

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APPENDIX 7A

BUILDING EMERGENCY PLAN FOR THE CENTRAL WASTE COMPLEX

This plan covers the following buildings and structures: 285-W Sanitary Water Shed, 286-W Sanitary Water Shed, MO-288, 2401-W, 2402-W, 2402-WB through 2402-WL, 2403-WA through -WD, and 2404-WA through -WC Waste Storage Buildings, Flammable and Alkali Metal Waste Storage Modules, Waste Receiving and Staging Area, 2120-WA Sprung Structure, 2120-WB Sprung structure, and the Waste Storage Pad.

Approved:

Building Emergency Director	5/13/98 Date
Manager, Solid Waste Project	5/13/98 Date
Hanford Fire Department	5-13-98 Date
Emergency Preparedness	5-13-98 Date

This plan will be reviewed annually and updated as required by the Building Emergency Director and modified pursuant to Washington Administrative Code (WAC) 173-303-830 and in accordance with the Hanford Facility RCRA Permit. This document will be approved by the Manager of Emergency Preparedness (or delegate) and the Hanford Fire Department.

CONTENTS

1.0 GENERAL INFORMATION

The Central Waste Complex (CWC) is located on the Hanford Site, a 560-square-mile U.S. Department of Energy (DOE) operational site in southeastern Washington State. The CWC is located in the western portion of the 200 West Area. The Hanford Site Emergency Preparedness Program is based upon the incident command system which allows a graded approach for response to emergency events. This plan contains a description of unit specific emergency planning and response. It is used in conjunction with DOE/RL-94-02, *Hanford Emergency Response Plan*. Response to events is performed using unit specific and/or Site level emergency procedures. The CWC subordinate documents implement DOE/RL-94-02.

1.1 FACILITY NAME: U.S. Department of Energy Hanford Site Central Waste Complex

1.2 FACILITY LOCATION: Benton County, Washington; within the 200 West Area.

The following buildings/structures are covered by this plan:

*285-W	Sanitary Water Shed
*286-W	Sanitary Water Shed
*MO-288	Mobile Office Building
*2120-WA	Sprung Structure Miscellaneous Material/Equipment Storage
*2120-WB	Sprung Structure Miscellaneous Material/Equipment Storage
2401-W	Waste Storage Building
2402-W	Waste Storage Building
2402-WB	Waste Storage Building
2402-WC	Waste Storage Building
2402-WD	Waste Storage Building
2402-WE	Waste Storage Building
2402-WF	Waste Storage Building
2402-WG	Waste Storage Building
2402-WH	Waste Storage Building
2402-WI	Waste Storage Building
2402-WJ	Waste Storage Building
2402-WK	Waste Storage Building
2402-WL	Waste Storage Building
2403-WA	Waste Storage Building
2403-WB	Waste Storage Building
2403-WC	Waste Storage Building
2403-WD	Waste Storage Building
2404-WA	Waste Storage Building
2404-WB	Waste Storage Building
2404-WC	Waste Storage Building

Flammable Waste Storage Modules (1 through 27)
Alkali Metal Waste Storage Modules (1 through 4)
Waste Receiving and Staging Area
Waste Storage Pad

* Not part of the CWC treatment and storage activities; therefore, not subject to Washington Administrative Code 173-303 regulations.

1.3 OWNER:

U.S. Department of Energy
Richland Operations Office
825 Jadwin Avenue
Richland, Washington 99352

FACILITY MANAGER: Waste Management Federal Services of Hanford, Inc.
P.O. Box 700
Richland, Washington 99352

1.4 DESCRIPTION OF THE FACILITY AND OPERATIONS

The CWC provides storage for dangerous, mixed, and radioactive waste. Buildings, storage modules, and storage pads provide space for waste containers.

1.5 BUILDING EVACUATION ROUTING (BUILDING LAYOUT)

Figure 1 provides identification of the primary and secondary staging areas and a general overview of the CWC.

1.5.1 Building Evacuation Routes

Figure 1 provides identification of emergency evacuation routes from the CWC.

1.5.2 Building Evacuation Routes (Building to Staging Area)

The primary staging area for the CWC is located southeast of the Waste Receiving and Staging Area. The alternate staging area for the CWC is located at the northwest corner of the MO-720/721 parking lot. Evacuation alarms are described in Section 7.1; responses to alarms are described in Section 7.2.

2.0 PURPOSE

This Building Emergency Plan describes both the hazards and the basic responses to off-normal and/or emergency conditions at CWC. "Emergency" as used in this document includes events meeting the Washington Administrative Code (WAC) 173-303 definition of Emergency, as well as U.S. Department of Energy (DOE) Order 232.1 categories of Unusual Occurrence and Emergency. These events include spills or releases as a result of waste management, fires and explosions, transportation activities, movement of materials, storage of hazardous materials, packaging, and natural and security contingencies. When used in conjunction with DOE/RL-94-02, *Hanford Emergency Response Plan*, this plan meets the requirements for contingency planning as required by WAC 173-303.

3.0 BUILDING EMERGENCY ORGANIZATION

The CWC maintains a weekly on-call list for technical expert notification. Upon notification, the on-call person will notify the primary or alternate Building Emergency Director (BED) to respond to the scene in person as necessary. The on-call technical expert will maintain contact with the on-scene Incident Commander (IC) until arrival of CWC personnel.

Building emergency organizations are discussed in the following sections.

3.1 BUILDING EMERGENCY DIRECTOR

Emergency response will be directed by the BED until the IC arrives. The incident command structure and staff with supporting on-call personnel fulfill the responsibilities of the Emergency Coordinator as discussed in WAC 173-303-360.

During events, CWC personnel perform response duties under the direction of the BED. The Incident Command Post (ICP) is managed by either the senior Hanford Fire Department member present on the scene or senior Hanford Patrol member present on the scene (security events only). These individuals are designated as the Incident Commander (IC) and as such have the authority to request and obtain any resources necessary for protecting people and the environment. The BED becomes a member of the ICP and functions under the direction of the IC. In this role the BED continues to manage and direct CWC operations.

A listing of the primary and alternate BEDs by title, work location and work telephone numbers is contained in a separate, internally controlled document. The BED is on the premises or is available through an 'on-call' list 24 hours a day. Emergency Preparedness maintains a listing of BED names, work and home telephone numbers at the Patrol Operations Center (POC) in accordance with *Hanford Facility RCRA Permit*, Dangerous Waste Portion, General Condition II.A.4.

3.2 OTHER MEMBERS

As a minimum, the BED appoints and ensures training is provided to individuals who perform as Personnel Accountability Aides and Staging Area Managers. The Accountability Aides are responsible for facilitating the implementation of protective actions (evacuation or take cover) and for facilitating the accountability of personnel after the protective actions have been implemented. Staging Area Managers are responsible for coordinating/conducting activities at the Staging Area.

In addition, the BED may identify additional support personnel (radiological control [RC], maintenance, engineering, hazardous material coordinators, etc.) to be part of the building emergency organization.

The building emergency organization listing of positions, names, work locations, and telephone numbers for the CWC is maintained in a separate location in a format approved by CWC management. Copies are distributed to appropriate facility locations and to Emergency Preparedness. The building emergency organization list for the CWC is posted at the RL-Emergency Operations Center, MO-288, and at the ICP in MO-720 in the 200 West Area.

4.0 IMPLEMENTATION OF THE PLAN

To meet the requirements of WAC 173-303-360, this plan will be considered to be implemented when the BED has determined that a release, fire, or explosion that could threaten human health or the environment (WAC 173-303-360 Emergency) has occurred at CWC. The incident classification process is described in DOE/RL-94-02, Section 4.2.

Under the DOE guidance, this plan will be considered implemented whenever the BED determines that one of the incidents listed in Section 6.0 has or will occur and that the severity is or will be such that there is a potential to threaten human health or the environment (DOE Unusual Occurrence or Emergency). The BED will implement this plan through DOE/RL-94-02, *Hanford Emergency Response Plan*, and CWC and/or site-specific procedures (see Attachment A). DOE declared emergencies are assigned to three classifications, which are listed in order of increasing severity: alert emergency, site area emergency, and general emergency. The CWC implements these DOE emergencies through identified criteria in DOE-0223, RLEP 1.1, Appendix 1-2.D; this plan; and other documents listed in Attachment A.

The BED must assess each incident to determine the response necessary to protect personnel, CWC, and the environment. If assistance from Hanford Patrol, Fire, or ambulance units is required, the Hanford Emergency Response Number 911 (373-3800 if using a cellular telephone) must be used to contact the Patrol Operations Center and request the desired assistance. To request other resources or assistance from outside the CWC, the Patrol Operations Center business number is used (373-3800). The Emergency Duty Officer (EDO) is requested when making the initial 911 call.

5.0 FACILITY HAZARDS

Hazards at the CWC potentially include radiological, chemical, and industrial hazards.

5.1 HAZARDOUS MATERIALS

Hazardous materials include (but might not be limited to) the following: spray adhesive, sorbent, diesel fuel, hydraulic oil, propane, road salt, industrial cleaner and degreaser, and unleaded gasoline. The use, storage, and inventory of hazardous materials is controlled. Hazardous material inventories and material safety data sheets (MSDS) are maintained in MO-288.

5.2 INDUSTRIAL HAZARDS

Industrial hazards could include injuries from falls, transportation incident, accidents with moving equipment, exposure to spilled waste or chemicals, or from radiological or chemical exposure from spills. Potential material handling mishaps are associated with forklift or crane operations. These include potential rupture of packages due to misalignment of the forklift tines or a load dropped during a crane operation.

5.3 WASTE STORAGE LOCATIONS

Waste is stored in the following locations:

2401-W Waste Storage Building
2402-W Waste Storage Building
2402-WB Waste Storage Building
2402-WC Waste Storage Building
2402-WD Waste Storage Building
2402-WE Waste Storage Building
2402-WF Waste Storage Building
2402-WG Waste Storage Building
2402-WH Waste Storage Building
2402-WI Waste Storage Building
2402-WJ Waste Storage Building
2402-WK Waste Storage Building
2402-WL Waste Storage Building
2403-WA Waste Storage Building
2403-WB Waste Storage Building
2403-WC Waste Storage Building
2403-WD Waste Storage Building
2404-WA Waste Storage Building
2404-WB Waste Storage Building
2404-WC Waste Storage Building
Flammable Waste Storage Modules (1 through 27)
Alkali Metal Waste Storage Modules (1 through 4)
Waste Receiving and Staging Area
Waste Storage Pad.

5.4 CRITICALITY

Criticality has been evaluated as being 'incredible,' less than one chance in a million in a year, in the authorization basis. Therefore, there are no facility specific actions required.

6.0 POTENTIAL EMERGENCY CONDITIONS

The credible types of and extent of emergencies caused are described here, unless identified as Not Applicable (N/A). The response action for each type of emergency is listed in Section 7.0.

Potential emergency conditions, under both WAC 173-303 and DOE guidance, may include one of three basic categories: operations (process upsets, fires and explosions, loss of utilities, spills, and releases), natural phenomena (earthquakes), and security contingencies (bomb threat, hostage situation, etc.).

6.1 FACILITY OPERATIONS EMERGENCIES

The following sections include a description of the 'worst-case' accident anticipated for each of the identified credible emergencies. This information typically is derived from the safety analysis report, hazards evaluation, or risk assessment for the unit.

6.1.1 Loss of Utilities

- Loss of Electricity. Electricity powers two louvered exhaust fan systems in each of the 2402-W series and 2404-W series buildings and four louvered exhaust fan systems in the 2403-W series buildings. Loss of electrical power will result in deactivation of the fixed-head air sampler and exhaust fans but does not constitute an emergency situation.

- Loss of Water. Loss of fire sprinkler systems in the 2402-W series buildings, the 2403-W series buildings, and the 2404-W series buildings negatively impacts fire fighting capabilities.

- Loss of Ventilation. In the event of leaking containers, loss of fan ventilation in the storage buildings might result in the buildup of toxic or explosive vapors.

- Loss of Steam - N/A.

- Loss of Air - N/A.

6.1.2 Major Process Disruption/Loss of Plant Control - N/A.

6.1.3 Pressure Release

Potential pressure hazards at the CWC involve pressure buildup in stored containers.

6.1.4 Fire and/or Explosion

Potential fire hazards include smoke inhalation, burns, damage to equipment and/or structures, and release of hazardous materials or dangerous, mixed, and radioactive waste constituents from containers.

A fire or an explosion in the CWC might result in a dangerous, mixed, or radioactive waste release.

The combustion potential for chemicals such as peroxides or pyrophorics within containers is controlled by the management of waste packaging in accordance with onsite methods. The WAC 173-303 regulations prohibit the storage of chemically incompatible materials in common containers. Additionally, WAC 173-303 prohibits mixing containers of incompatible waste within common storage areas.

The 2401-W, 2402-W, 2403-W and 2404-W series buildings are equipped with individual fire system alarms. Fire alarm pull boxes are located at each exit and at the main entrance.

6.1.5 Hazardous Material Spill

Hazardous materials are stored in the CWC. Spills or releases of hazardous materials could result in the following conditions:

- Spill of Hazardous Material. Hazards associated with a spill include potential exposure to dangerous constituents as well as potential environmental damage. Releases likely would be confined within the CWC.

- Toxic Fumes Hazards. Hazardous materials stored at the CWC is a potential airborne contamination hazard. Volatile materials such as concentrated caustics and solvents might generate toxic fumes.

- Fires or Explosions Involving Hazardous Material. A fire or chemical reaction in the CWC could result in the release of dangerous constituents to the air or soil.

- Reactive Chemical/Corrosive Material Hazards. Misrepresented shipments and/or transfers of incompatible hazardous materials stored at the CWC could potentially cause chemical reactions resulting in fire, explosion, and dangerous waste releases. Acidic and basic solutions are corrosive and could cause chemical burns.

- Thermal Reactions/Hazards. Thermal reactions could cause burns, chemical burns, and toxic fumes, and cause pressure hazards in sealed containers.

- Flammable Material/Liquids Hazards. Hazards associated with flammable materials and liquids include fire, explosion, and release of dangerous waste.

- Asbestos Release. The CWC structure does not contain asbestos, but dangerous waste containing asbestos could be stored inside containers stored within the structure. Release of friable asbestos waste could result in an inhalation hazard.

- Explosive Materials/Munitions Hazards - N/A.

6.1.6 Dangerous and Mixed Waste Spill

A dangerous, mixed, and/or radioactive waste spill could result in potential personnel contamination through skin contact or via airborne contamination. Environmental impact could include contaminated water or soil.

- Spill of Dangerous and Mixed Waste. Hazards associated with a spill include potential exposure to dangerous, mixed, and/or radioactive constituents as well as potential environmental damage. Releases likely would be confined to a local area because container contents routinely are not in a liquid or powder form.

- Toxic Fumes Hazards. Dangerous, mixed, and radioactive waste stored at the CWC is a potential airborne radioactive contamination hazard. Volatile materials such as concentrated caustics and solvents might generate toxic fumes. Plutonium, an alpha emitter, is known to generate hydrogen (H_2) gas when hydrogenous materials are present in the waste; however, catalytic recombiners are used to maintain H_2 gas concentrations below 1 percent in waste containers and are replaced whenever the waste is repackaged. The recombiners used onsite are projected to maintain the oxygen (O_2) concentration below 0.5 percent, and the H_2 concentration below 1 percent.

NOTE: *Container damage resulting in material upset without the $H_2 + O_2$ recombiner could lead to a hydrogen explosion and subsequent release to onsite populations and the environment.*

Waste acceptance criteria require that the offsite generators and onsite generating units document waste with gas-generating potential and that the requirement for gas recombiners be specified on the waste tracking forms.

- Fires or Explosions Involving Dangerous and Mixed Waste. A fire or chemical reaction in the CWC could result in the release of dangerous and/or radioactive constituents to the air or soil.

- Reactive Chemical/Corrosive Hazards. Misrepresented shipments and/or transfers of incompatible dangerous or mixed waste managed at the CWC could potentially cause chemical reactions resulting in fire, explosion, and dangerous, mixed, and/or radioactive waste releases. Acidic and basic solutions are corrosive and could cause chemical burns.

- Thermal Reactions/Hazards - Thermal reactions could cause burns, chemical burns, and toxic fumes, and cause pressure hazards in sealed containers.

- Flammable Material/Liquids Hazards. Fire involving flammable materials/liquids could cause damage to containers resulting in potential dangerous, mixed, and or radioactive waste releases. Liquid waste stored at the CWC could include containers with lab packs (e.g., vials of liquids packed with absorbent solids) or containers containing solvent-soaked rags that are packed with absorbent material. Except for lab packs, containers with free liquid cannot have greater than 10 percent unabsorbed liquid. If a fire occurs involving these items, a 'worst case' (e.g., assume entire container is liquid) will be assumed until the containers can be opened and inspected.

- <u>Asbestos Release</u>. Asbestos materials are potential components of waste stored at the CWC. Damage to these containers could result in an unplanned release of friable asbestos to the environment, creating an inhalation health hazard.

- <u>Explosive Materials/Munitions Hazards</u> - N/A .

6.1.7 Transportation and/or Packaging Incidents

Potential consequences of transportation and/or packaging incidents are spills or spread of radioactive contamination, chemical contamination, or personnel contamination. A forklift-damaged container could result in fire or explosion.

6.1.8 Radiological Material Release

- <u>Gaseous Effluent Discharges (Stack Releases)</u> - N/A.

- <u>Liquid Effluent Discharges</u> - N/A.

- <u>Significant Contamination Spread/Releases</u>. Significant contamination spread or release might involve hazards resulting from exposure to dangerous, mixed, and/or radioactive waste. The major potential cause of spread or a release includes damaged containers, high winds, or a fire that might disperse contaminated airborne particles.

6.1.9 Criticality

The CWC is a Limited Control Facility because the CWC can contain more than one-third of a minimum critical mass, but the form or distribution of the fissionable material precludes a criticality accident.

6.1.10 Dangerous, Mixed, and Radioactive Waste Not Acceptable (and Cannot be Transported)

Acceptable reasons for denying receipt of a dangerous, mixed, and/or radioactive waste transfer/shipment are as follows.

- The CWC is not capable of managing the dangerous waste type.

- A significant discrepancy exists between the transfer/shipment and the waste listed on the manifest or tracking form.

- The waste arrives in a condition that presents an unreasonable hazard to operations or personnel.

6.2 NATURAL PHENOMENA

Natural phenomena are discussed in the following sections.

6.2.1 Seismic Event

Depending on the magnitude of the event, severe structural damage could occur resulting in serious injuries or fatalities and the release of dangerous, mixed, and/or radioactive waste. Damaged electrical circuits and wiring could result in the initiation of multiple fires.

6.2.2 Volcanic Eruption/Ashfall

Ashfall could cause shorts in electrical equipment and plug ventilation system filters.

6.2.3 High Winds/Tornados

High winds or tornados might cause structural damage to systems containing dangerous, mixed, and/or radioactive waste resulting in a release of these constituents to the environment.

6.2.4 Flood - N/A.

6.2.5 Range Fire

The hazards associated with a range fire include those associated with a building fire plus potential site access restrictions and travel hazards such as poor visibility.

6.2.6 Aircraft Crash

In addition to the potential serious injuries or fatalities, an aircraft crash could result in the direct release of dangerous, mixed, and/or radioactive waste or cause a fire that could lead to the release of dangerous, mixed, and/or radioactive waste.

6.3 SECURITY CONTINGENCIES

Security contingencies are discussed in the following sections.

6.3.1 Bomb Threat

A bomb threat might be received by anyone who answers the telephone or receives mail. The major effect on CWC is that personnel will need to perform an emergency shutdown for personnel to be evacuated. If a bomb explodes, the effects are the same as those discussed under fire and explosion.

6.3.2 Hostage Situation

A hostage situation could pose an emergency situation if there is the potential to adversely impact CWC. This can be as a result of losing control (operators removed from their stations) or when the situation results in the coercion of personnel to take some malevolent action.

6.3.3 Suspicious Object

The major effect on CWC is that personnel will need to perform an emergency shutdown for personnel to be evacuated.

7.0 INCIDENT RESPONSE

The initial response to any emergency is to immediately protect the health and safety of persons in the affected area. Identification of released material is essential to determine appropriate protective actions. Containment, treatment, and disposal assessment will be the secondary responses.

The following sections describe the process for implementing basic protective actions as well as descriptions of response actions for the events listed in Section 6.0. DOE/RL-94-02, Section 1.3, provides concept of operations for emergency response on the Hanford Site.

7.1 PROTECTIVE ACTIONS RESPONSES

Protective actions responses are discussed in the following sections.

7.1.1 Evacuation

If an evacuation is ordered or the evacuation siren sounds at CWC, personnel shall proceed to the following staging areas:

Central Waste Complex Staging Areas	Area	Location
Primary staging area	Central Waste Complex	Southeast of the Waste Receiving and Staging Area
Secondary staging area	MO-720/721 Complex	Northwest corner of parking lot

The BED or Staging Area Manager directs the evacuation; however, to ensure that evacuations are conducted promptly and safely, all personnel shall be familiar with the correct evacuation procedure. The order to evacuate normally will be passed via the site Crash Alarm Telephone system.

Area evacuations are either rapid or controlled, as pointed out in the following steps. When possible, the following steps must be conducted concurrently.

Area Evacuation Procedure
Halt any operations or work and place the equipment and structures in a safe condition. Use emergency shutdown procedures for rapid evacuation.
Use whatever means are available (bullhorns, runners, etc.) to pass the evacuation information to personnel.
Evacuate personnel to the staging area; group personnel as follows: potentially contaminated protective clothing, keys immediately available for vehicles, those needing rides.
Conduct personnel accountability. Report personnel accountability results to the RL-Emergency Operations Center (RL-EOC) (373-1786, 373-3876, 376-8612, 376-4712).
Inform IC of any potentially affected personnel (i.e., injured, contaminated, exposed, etc.) once the IC arrives at the ICP.
Relay pertinent evacuation information (routes, destination, etc.) to drivers.
Dispatch vehicles as soon as the vehicles are loaded.
Report status to the RL-EOC, request additional transportation if required, and report if any personnel remain who are performing late shutdown duties.

7.1.2 Take Cover

When the Take Cover Alarm is activated, personnel must take cover in the nearest building or trailer and report their location to line management or the Building Emergency Director. Normally, the CWC will be alerted of a Take Cover via the Area Crash Alarm Telephone System at MO-288 and/or the area emergency sirens. A message followed by the Take Cover siren will be transmitted over the area emergency sirens. The following actions must be taken or considered:

- Shut doors and windows and wait for further instructions
- Secure ventilation system
- Follow normal exit procedures from radiological areas
- Lock up classified documents and prepare for a possible evacuation
- Report your location to the Accountability Aid or the BED
- Accountability Aides will provide accountability status to the Staging Area Manager for facility personnel during an event.

7.2 RESPONSE TO FACILITY OPERATIONS EMERGENCIES

Depending on the severity of the event, the BED reviews site-wide procedures, the unit-specific emergency response guide, specific sections of this plan, and/or plant operating procedures (POPs) and classifies the event, initiates area protective actions (facility and area sirens, notifications, etc.) and activates the site emergency response organization. Attachment A provides a list of procedures and emergency response guides.

7.2.1 Loss of Utilities

- Loss of Electricity. Personnel notify the BED and the appropriate maintenance personnel for repair.
- Loss of Water. Loss of water to a fire protection system is classified as an emergency condition. Personnel notify the Hanford Fire Department, and establish a fire watch.
- Loss of Ventilation. Personnel notify the BED and the appropriate maintenance personnel for repair.
- Loss of Steam - N/A.
- Loss of Air - N/A.

7.2.1.1 Utility Disconnect Plan for Central Waste Complex

Use these steps to place the utilities in a safe and secure condition when an emergency has been declared, or when directed by the BED.

- Heating, Ventilation, and Air Conditioning (HVAC)

  2401-W Building. Place the "Northeast Fan" and "Southwest Fan" switches (located in the main electrical distribution control panel on the west wall) in the OFF position.

  2402-W Series Buildings. Place the "Fan NE" and "Fan SW" switches (located in the main electrical distribution control panel on the east or west wall) in the OFF position.

  2403-W Series Buildings. Place disconnect switches in the main panel in the OFF position. Each of the four fan units has an electrical disconnect located on the north wall near the unit. Specific electrical service locations are as follows.

  - Main electrical service disconnect is located 29.53 feet south of the 2403-WA building.
  - Interior building electrical disconnects are located near the center on the east and north walls of 2403-WA and 2403-WB buildings.

- Disconnects for 2403-WC and 2403-WD buildings are located near the center of the west and north walls.

2404-WA and 2404-WB Place the two disconnect switches located on the interior of the west end of the building just south of the west personnel door in the OFF position. In addition, both buildings have an emergency shut off switch located on the exterior of the west side of the buildings between the personnel door and the roll up door.

The exhaust fan on top of the mechanical/electrical/telephone room is de-energized by placing circuit 2 in panel B in the OFF (open) position.

2404-WC Place the two disconnect switches located on the interior of the east end of the building just south of the east personnel door. There is an emergency shut off switch located on the east side of the exterior of the building between the personnel door and the roll up door.

The exhaust fan on top of the mechanical/electrical/telephone room is de-energized by placing circuit 2 in panel B in the OFF (open) position.

- Electrical

2401-W Building. Place the "Service Disconnect" switch (located in the main electrical distribution panel on west wall) in the OFF position.

2402-W Series Buildings. Place the "Service Disconnect" switch (located in the main electrical distribution panel on the east or west wall) in the OFF position.

2403-W Series Buildings. Place the "Service Disconnect" switch (located in the main electrical service disconnect at the outside panel on the southeast corner of 2403-WA Building on the electrical service pad) in the OFF position.

2404-W Series Buildings. Place the "Main Breaker" switch located in Panel "A" in the OFF (open) position. Panel "A" is located on the east wall of the M/E/T room in 2404-WA and 2404-WB and on the west wall of the M/E/T room in 2404-WC.

- Fire Sprinkler System (interior shutoff)

NOTE: These valves should be shut ONLY after consulting the Hanford Fire Department.

2404-W Series Buildings. Turn one of the two valves (located on either side of the backflow preventer) in the fire riser room to the closed position. Note that a tamper alarm will be received at the fire station.

- Fire Sprinkler System (exterior shutoff)

  NOTE: These valves should be shut ONLY after consulting the Hanford Fire Department.

  2401-W Building. Use the operating wrench affixed to the post-indicator valve (located south of the 285-W valve shed) to shut the valve. The valve is closed when the valve window words change from "Open" to "Shut."

  2402-W Series Buildings. Use the operating wrench to shut the valve (located about 224.7 feet west of the buildings). The valve is closed when the valve window words change from "Open" to "Closed."

  2403-W Series Buildings. Use the operating wrench affixed to the valves to shut the valves. The valve is closed when the valve window words change from "Open" to "Shut." The valves are located as follows:

2403-WA and 2403-WB	north of building
2403-WC and 2403-WD	east of building

  2404 Series Buildings. Use the operating wrench to shut off the PIV valves. The valve is closed when the valve window words change from "Open" to "Shut." The valves are located as follows:

  2404-WA valve 260 S located approximately 32.8 feet southwest of the building
  2404-WB valve 418 S located approximately 32.8 feet west of the building
  2404-WC valve 420 S located approximately 32.8 feet southeast of the building

- Sanitary Water/Sewer. For the CWC buildings, the back flow preventers cannot be disconnected by hand. Call the Hanford Fire Department at 911 (373-3800 if using a cellular phone) to disconnect.

- Process Water - N/A.

- Steam - N/A.

- Telephone Service. Call 376-6322 or 376-1611 and ask for the Telephone Service Contractor to disconnect service.

7.2.2 Major Process Disruption/Loss of Plant Control - N/A.

7.2.3 Pressure Release

On discovery of an existing or potential pressure hazard at CWC, ensure the following response:

- Notify personnel to leave the area of the hazard

- Inform the BED

- Evacuate affected areas

- Perform sampling or testing in accordance with recommendations from engineering and industrial safety, and (if indicated) repackage any containers with pressure buildup.

7.2.4 Fire and/or Explosion

Fire fighting in the CWC is complicated by the presence of large amounts of dangerous, mixed, and/or radioactive waste. To avoid contamination, it is extremely important to avoid breaching containers, buildings, or any other containment where there is dangerous, mixed, and/or radioactive waste.

In the event of a fire, the discoverer activates a fire alarm, calls 911 (373-3800 if using a cellular phone), and evacuates. Automatic initiation of a fire alarm (through the smoke detectors and sprinkler systems) also is possible.

- On actuation of the fire alarm, personnel shut down equipment, secure waste, ONLY if time permits. The alarm automatically signals the Hanford Fire Department

- Personnel leave the area/building by the nearest safe exit and proceed to the designated staging area for accountability unless otherwise instructed

- The BED proceeds directly to the MO-720 conference room and sets up the Incident Command Post. The BED will obtain all necessary information pertaining to the incident and will meet with, or send a representative to meet with, the Hanford Fire Department

- The BED informs the IC of any potentially affected personnel (i.e., injured, contaminated, exposed, etc.) when the IC arrives at the ICP

- Depending on the severity of the event, the BED reviews site-wide procedures, the facility specific emergency response guide, specific sections of this plan, and/or POPs and classifies the event and initiates area protective actions (facility and area sirens, notifications, etc.) and site emergency response organization activation. Attachment A provides a list of procedures and emergency response guides

- The BED informs the site organization as to the extent of the emergency (including estimates of mixed waste or radioactive material quantities released to the environment)

- If operations are stopped in response to a fire, the BED ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures

- Hanford Fire Department firefighters extinguish the fire
- The BED ensures that all emergency equipment is cleaned and fit for its intended use following completion of cleanup procedures.

7.2.5 Hazardous Material, Dangerous, Mixed, and/or Radioactive Waste Spill

Spills can result from many sources including process leaks, container spills or leaks, damaged packages or shipments, or personnel error. Spills of mixed waste are complicated by the need to deal with the extra hazard induced by the presence of radioactive materials. The appropriate response to a spill or release is identified as follows.

The discoverer performs the following actions for a spill and/or release:

- Notifies CWC personnel (including BED) of discovery of spill or release
- Initiates notifications to the Hanford Fire Department (HazMat Team) by calling 911 (373-3800 if using a cellular phone), and provides all known information, or verifies that the BED has called 911 or determined that emergency response assistance is not required
- Ensures that any personnel that have been exposed to a spilled chemical and/or have suffered an injury receive proper first aid, immediate medical attention, and that the PHMC health advocate is contacted by the EDO. In case of contact with a chemical, immediately flush eyes or skin with water for at least 15 minutes and promptly remove contaminated clothing and shoes. **Immediately** contact supervision and the Patrol Operations Center at 911 (373-3800 if using cellular phone) to report any injuries or exposure and obtain Hanford Fire Department medical response.
- Takes action to contain and/or to stop the spill or container leak only if all of the following are true:
  - The identity of the substance(s) involved is known
  - Appropriate protective equipment and control/cleanup supplies, e.g., absorbents, are readily available
  - Discoverer can safely perform the action(s) without assistance, or assistance is readily available from other trained personnel.

If any of the previous conditions are not met or if there is any doubt, evacuate the area and remain outside, upwind of the spill. The discoverer will remain available for consultation with the BED, Hanford Fire Department, or other emergency response personnel and restricts access to the area until the arrival of the BED.

The BED performs or arranges for the following:

- Establishes a command post at a safe location, and coordinates further spill mitigation activities

NOTE: The incident command post for all Solid Waste units is located in the MO-720 conference room; the command post may be moved to another location at the discretion of the BED.

- Obtains all available information pertaining to the incident and determines if the incident requires implementation of DOE/RL-94-02

- Reviews site-wide procedures, the CWC specific emergency response guide, specific sections of this plan, and/or POPs and classifies the event and initiates area protective actions (facility and area sirens, notifications, etc.) and site emergency response organization activation. Attachment A provides a list of procedures and emergency response guides

- Informs the IC of any potentially affected personnel (i.e., injured, contaminated, exposed, etc.) when the IC arrives at the ICP

- Arranges for care of any injured persons

- Maintains access control at the incident site by keeping unauthorized personnel and vehicles away from the area. Security personnel can be used to assist in site control if control of the boundary is difficult (e.g., repeated incursions). In determining controlled access areas, considers environmental factors such as wind velocity and direction

- Arranges for proper remediation of the incident after evaluation

- Remains available for fire, patrol, and other authorities on the scene, and provides all required information

- Enlists the assistance of alternate BED(s), if response activities are projected to be long term

- Ensures the use of proper protective equipment, remedial techniques, transfer procedures [including ignition source control (e.g., nonsparking tools, grounding containers, isolation of ignition sources, use of explosion-proof electrical equipment, etc.) for flammable or reactive spills], and decontamination procedures by all involved personnel, if remediation is performed by CWC personnel

- Remains at the emergency command post to oversee activities and to provide information, if remediation is performed by the Hanford Fire Department Hazardous Materials Response Team or other response teams

- Ensures proper containerization, packaging, and labeling of recovered spill materials and overpacked containers

NOTE: All containers of spill debris, recovered product, etc., are managed in the same manner as waste containers. Overpacks in use are marked with information pertaining to their contents and noted as to the condition of the inner container (major leak, pinhole leak, etc.).

- If operations are stopped in response to the release, ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures

- Ensures decontamination (or restocking) and restoration of emergency equipment used in the spill remediation before resuming operations

- Provides required reports after the incident, in accordance with DOE/RL-94-02, *Hanford Emergency Response Plan.*

7.2.5.1 Receipt of Damaged or Unacceptable Shipments

In accordance with WAC 173-303-370, when a damaged shipment or transfer of dangerous, mixed, and/or radioactive waste arrives at the CWC and the shipment/transfer is unacceptable for receipt, the damaged shipment/transfer must not be moved.

If a damaged shipment or transfer results in a spill, the following actions are performed:

- Notify the BED, the Hanford Fire Department, and the appropriate personnel to advise of the situation. The BED responds and assists in the evaluation of, and response to, the incident. The BED informs the IC of conditions upon arrival

- Notify the offsite generator or onsite generating unit of the damaged shipment/transfer, and request any information necessary to assist in responding to the spill

- Proceed with remedial action, including overpacking damaged containers, cleanup of spilled material, or other necessary actions to contain the spill. Refer to Section 7.2.5 for remedial actions.

7.2.5.2 Transportation Incidents

In accordance with WAC 173-303-145, the discoverer or BED could take the following actions for leaks or spills resulting from a hazardous materials transportation incident if the actions can be performed without jeopardizing personnel safety, as appropriate:

- Determines the nature of incident
  - Personnel injuries
  - Hazardous material spill with fire
  - Hazardous material spill without fire

- Assists injured personnel

- Initiates notifications to the appropriate personnel by any means available (telephone, radio, passing motorist, etc.) to request assistance from the Hanford Fire Department (Emergency Coordinator/Incident Commander for these type of events), Hanford Patrol, and medical personnel

- Remains in a safe location and attempts to isolate the area to prevent inadvertent personnel access

- The BED informs the IC of any potentially affected personnel (i.e., injured, contaminated, exposed, etc.) when the IC arrives at the ICP.

7.2.6 Radiological Material Release

- Radioactive Gaseous Effluent Discharge. Air sampling will be performed using the appropriate equipment any time a worker is likely to be exposed to 10 percent of the isotopes Derived Air Concentration (DAC). Tritium oxide (HTO) has a DAC value of 20 $\mu Ci/m^3$. For better control of personnel exposures, the following table is included.

Airborne Concentration Equal to 5 mrem Dose Equivalent			
Concentration	**Time**	**Concentration**	**Time**
10 $\mu Ci/m^3$	4 hours	150 $\mu Ci/m^3$	15 minutes
15 $\mu Ci/m^3$	2.5 hours	200 $\mu Ci/m^3$	12 minutes
20 $\mu Ci/m^3$	2 hours	250 $\mu Ci/m^3$	10 minutes
30 $\mu Ci/m^3$	1 hour, 20 min	300 $\mu Ci/m^3$	8 minutes
50 $\mu Ci/m^3$	50 minutes	350 $\mu Ci/m^3$	7 minutes
80 $\mu Ci/m^3$	30 minutes	400 $\mu Ci/m^3$	6 minutes
100 $\mu Ci/m^3$	25 minutes	450 $\mu Ci/m^3$	5 minutes

All personnel possibly exposed to HTO will have a tritium bioassay performed as soon as possible (must be within 30 days of exposure).

- Radioactive Liquid Effluent Discharge. If fire protection water is released, the liquid will be contained and captured with absorbents if feasible. Surrounding areas will be sampled.

- Significant Contamination Spread. Stop work activities and immediately exit the area. Contact RC and stand by for survey and contamination status. Notify immediate manager and the BED.

7.2.7 Criticality

As a Limited Control Facility, the form or distribution of fissionable material precludes a criticality accident.

7.2.8 Dangerous, Mixed, Radioactive Waste not Acceptable (and Cannot be Transported)

- Solid waste operations isolates the area of unacceptable waste.
- Discoverer notifies the BED. The BED responds, evaluates, and notifies appropriate personnel. The BED informs the IC of conditions upon arrival.
- The solid waste project group assembles an investigation team.
- The investigation team determines the circumstances and the actions to be taken.
- The solid waste project group proceeds with the actions determined by the investigation team.
- The solid waste project group submits a written report to Ecology within 15 days of the incident, for dangerous and mixed waste only, in accordance with the criteria set forth in Section 4.0.

7.3 PREVENTION OF RECURRENCE OR SPREAD OF FIRES, EXPLOSIONS, OR RELEASES

The BED, as part of the incident command system, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The following actions are taken:

- Isolates the area of the initial incident by shutting off power, shutting off or closing ventilation systems, etc., to minimize the spread of a release and/or the potential for a fire or explosion
- Inspects containment for leaks, cracks, or other damage
- Inspects for toxic vapor generation
- Removes released material and waste remaining inside of containment structures as soon as possible
- Contains and isolates residual waste material using dikes and absorbents
- Covers or otherwise stabilizes areas where residual released materials remain to prevent migration or spread from wind or precipitation run-off
- Installs new structures, systems, or equipment to enable better management of hazardous materials or dangerous, mixed, and/or radioactive waste

- Reactivates operations in affected areas only after cleanup of residual waste materials is achieved.

7.4 RESPONSE TO NATURAL PHENOMENA

Depending on the severity of the event, the BED reviews site-wide procedures, the CWC specific emergency response guide, specific sections of this plan, and/or POPs and classifies the event and initiates area protective actions and site emergency response organization activation. Attachment A provides a list of procedures and emergency response guides.

Responses to natural phenomena are discussed in the following sections.

7.4.1 Seismic Event

The primary role of the emergency response organization in a seismic event is coordinating the initial response to injuries, fires, and fire hazards and acting to contain or control hazardous materials, and dangerous, mixed, and/or radioactive waste releases.

Individuals must remain calm and stay away from windows and hazardous material, dangerous, mixed, and/or radioactive waste locations. Once the shaking has subsided, individuals must evacuate carefully and assist those needing help. The location of any trapped individuals is reported to the BED or to 911 (373-3800 if using a cellular phone).

The BED takes whatever actions are necessary to minimize damage and personnel injuries. Actions include the following:

- Coordinating searches for personnel and potential hazardous conditions (fires, spills, etc.)
- Conducting accountability
- Securing utilities and CWC operations
- Arranging rescue efforts, and notifying 911 (373-3800 if using a cellular phone) for assistance
- Determining if hazardous materials, dangerous, mixed, and/or radioactive waste were released
- Determining current local meteorological conditions
- Warning other operations and implementing protective actions if the release poses a danger
- Providing personnel and resource assistance to other operations if required and possible.

7.4.2 Volcanic Eruption/Ashfall

When notified of an impending ashfall, the BED will implement measures to minimize the impact of the ashfall, such as:

- Installing filter media over building ventilation intakes
- Installing filter media or protective coverings on outdoor equipment that could be adversely affected by the ash (diesel generators, equipment rooms, etc.)
- Shutting down some or all operations and processes
- Sealing secondary use exterior doors
- Releasing all but essential personnel to go home.

If as a result of the ashfall other emergency conditions arise (e.g., fires due to electrical shorts or lightning), response is as described in other paragraphs of this section.

7.4.3 High Winds/Tornados

Upon notification of impending high winds, the BED takes steps necessary to secure all outdoor waste, hazardous material containers, and storage locations. Personnel must shut all doors and warn other personnel to use extreme caution when entering or exiting the building. The BED contacts the on-call manager for maintenance support as needed.

7.4.4 Flood - N/A.

7.4.5 Range Fire

If a range fire reaches the CWC, the fire could have the potential to ignite flammable stored materials. Personnel must secure ventilation systems and exterior doors on buildings to prevent sparks from entering the buildings, and notify the BED. A fire watch will be posted at the discretion of the BED.

Responses to range fires are handled by preventive measures (i.e., keeping hazardous material and waste accumulation areas free of combustible materials such as weeds and brush). If a range fire breaches the CWC boundary, the response is as described in Section 7.2.4.

7.4.6 Aircraft Crash

The response to an aircraft crash is the same as that for responding to a fire and/or explosion.

7.5 SECURITY CONTINGENCIES

Depending on the severity of the event, the BED reviews site-wide procedures, the CWC specific emergency response guide, specific sections of this plan, and/or POPs and classifies the event and initiates area protective actions (facility and area sirens, notifications, etc.) and site emergency response organization activation. Attachment A provides a list of procedures and emergency response guides.

Security contingencies are discussed in the following sections.

7.5.1 Bomb Threat

- Telephone Threat. Individuals receiving telephoned threats try to gain as much information as possible from the caller (using a bomb threat checklist if available). On conclusion of the call, notify the BED and Security via 911 (373-3800 if using a cellular phone).

The BED evacuates CWC and queries personnel at the staging area regarding any suspicious objects. When Security personnel arrive, follow their instructions.

- Written Threat. Receivers of written threats handle the letter as little as possible. Notify the BED and Security. Depending on the content of the letter, the CWC may or may not be evacuated. The letter is turned over to Security personnel and their instructions are followed.

7.5.2 Hostage Situation/Armed Intruder

The discoverer of a hostage situation or an armed intruder reports this to 911 (373-3800 if using a cellular phone) and to the BED if possible. The BED, after conferring with Security personnel, may covertly evacuate areas of the CWC not observable by the hostage taker(s)/intruder. No alarms will be sounded.

Security will determine the remaining response actions and will activate the Hostage Negotiating Team if necessary.

7.5.3 Suspicious Object

The discoverer of a suspicious object reports this to the BED and calls 911 (373-3800 if using a cellular phone), if possible, and ensures that the object is not disturbed.

The BED will evacuate the CWC and (based on the description provided by the discoverer) attempt to determine the identity or owner of the object. This may be done by questioning CWC personnel at the staging area. If the identity/ownership of the object cannot be determined, Security will assume command of the incident. The canine unit will be used to determine if the package contains explosives. If there is a positive indication of explosives or it cannot be assured that there are no explosives, then the Richland Police Department's Explosive Ordnance Team will be dispatched to properly dispose of the object.

8.0 TERMINATION OF EVENT, INCIDENT RECOVERY AND RESTART OF OPERATIONS

DOE/RL-94-02, Section 8.0, describes these considerations. The extent by which these actions are employed is based on the incident classification of each event. In addition, DOE/RL-94-02 also contains considerations for the management of incompatible wastes, which may apply.

8.1 TERMINATION OF EVENT

For events where the RL-EOC is activated, the RL Emergency Manager has the authority to declare event termination. This decision is based on input from the BED, IC, and other emergency response organization members. For events where the RL-EOC is not activated, the incident command structure and staff will declare event termination.

8.2 INCIDENT RECOVERY AND RESTART OF OPERATIONS

A recovery plan is developed when necessary. A recovery plan is needed following an event when further risk could be introduced to personnel, the CWC, or the environment through recovery action and/or to maximize the preservation of evidence. Depending on the magnitude of the event and the effort required to recover from the event, recovery planning might involve personnel from RL and other contractors. If a recovery plan is required, the plan is reviewed by appropriate personnel and approved by a Recovery Manager before restart. Restart of operations is performed in accordance with the approved plan.

If this plan were implemented for a WAC 173-303-360 emergency (Section 4.0), Ecology must be notified before operations can resume. DOE/RL-94-02, Section 6.1, discusses different reports to outside agencies. This notification is in addition to those required reports and must include the following statements:

- There are no incompatibility issues with the waste and released materials from the incident.
- All the equipment has been cleaned, is fit for its intended use, and placed back into service. The notification can be made via telephone conference. Additional information that Ecology requests regarding these restart conditions will be included in the required 15-day report identified in WAC 173-303-360(2)(k).

For emergencies not involving activation of the RL-EOC, the BED ensures that conditions are restored to normal before operations are resumed. If the Hanford Site Emergency Organization was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of RL to restore conditions to normal. The makeup of this organization depends on the extent of the damage and its effects. The onsite recovery organization will be appointed by the appropriate contractor's management.

8.3 INCOMPATIBLE WASTE

After an event, the BED or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed until cleanup is completed. Cleanup actions are taken by CWC personnel or other assigned personnel. DOE/RL-94-02, Section 8.3, describes action to be taken, which might include, but are not limited to, any of the following:

- Neutralization of corrosive spills
- Chemical treatment of reactive materials to reduce hazards
- Overpacking or transfer of contents from leaking containers
- Use of sorbents to contain and/or absorb leaking liquids for containerization and storage and/or disposal
- Decontamination of solid surfaces impacted by released material, e.g., intact containers, equipment, floors, containment systems, etc.
- Disposal of contaminated porous materials that cannot be decontaminated and any contaminated soil
- Containerizing and sampling of recovered materials for classification and determination for proper management
- Followup sampling of decontaminated surfaces to determine adequacy of cleanup techniques as appropriate.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility before storage is performed, as necessary. Incompatible waste is not placed in the same container. Containers of waste are placed in approved storage areas appropriate for their compatibility class.

If incompatibility of waste was a factor in the incident, the BED or the onsite recovery organization ensures that the cause is corrected. Examples include modification of an incompatibility chart or increased scrutiny of waste from an offsite generator or onsite generating unit when incorrectly designated waste caused or contributed to an incident.

8.4 POST EMERGENCY EQUIPMENT MAINTENANCE AND DECONTAMINATION

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumables and disposable materials are restocked. Fire extinguishers are recharged or replaced.

The BED ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished, self-contained breathing apparatus are cleaned and refilled, protective clothing is cleaned or disposed of and restocked, etc.

Factors to consider when establishing an equipment and personnel decontamination station are as follows:

- Water supplies
- Containment/catch basins and/or systems
- Personnel necessary to accomplish proper decontamination
- Protective clothing
- Decontamination supplies (buckets, brushes, soap, chemicals as needed)
- Risk to personnel
- Weather conditions [i.e., severe heat, cold (current and forecasted)]
- Toxicity of material
- Porosity of equipment to be decontaminated
- Disposal requirements of decontamination rinse
- Use of controlled zones to maintain contamination control.

9.0 EMERGENCY EQUIPMENT

Hanford Site emergency resources and equipment are described and listed in DOE/RL-94-02, Appendix C.

9.1 FIXED EMERGENCY EQUIPMENT

Central Waste Complex Fixed Emergency Equipment		
Type	**Location**	**Capability**
Dry pipe valve sprinkler system	2401-W 2402-W 2402-WB through 2402-WL 2403-WA through 2403-WD 2404-WA through 2404-WC	Assist in fire control
Sprinkler system fire department connections	Outside FS-19 and FS-20 (not labeled)	Assist in fire control
Fire Alarms	Storage buildings	Warn Personnel of Fire

9.2 PORTABLE EMERGENCY EQUIPMENT

Central Waste Complex Portable Emergency Equipment		
Type	**Location**	**Capability**
Fire extinguishers	Storage building	Fire control
Dry chemical	2401-W 2402-W through 2402-WK 2403-WA through 2403-WD 2404-WA through 2404-WC Flammable Waste Storage Modules 2120-WA and 2120-WB Sprung Structures Waste Storage Pad	Class A, B, and C fires
Metlx	Alkali Metal Waste Storage Modules	Class D fires

9.3 COMMUNICATIONS EQUIPMENT/WARNING SYSTEMS

Signal	Meaning	Actions
Continuous 3-5 minute siren	Evacuation	Leave area immediately as directed
Wavering 3-5 minute siren	Take cover alarm	Seek shelter immediately as directed
Crash phone	Relay emergency information	Respond as directed

9.4 PERSONAL PROTECTIVE EQUIPMENT

Central Waste Complex Protective Equipment		
Type	**Location**	**Capability**
Supplied air	Available from the Fire Department	Protection from airborne hazards
Full-face respirator	271-T Mask Station	Protection from airborne particulates
Self-contained breathing apparatus	Available from the Fire Department	Breathing air supplied for work in hazardous atmospheres
PPE clothing	MO-288 Conex MO-223 Conex	Personnel protection against exposure

9.5 SPILL CONTROL AND CONTAINMENT SUPPLIES

Spill control equipment to be used for dangerous, mixed, and/or radioactive waste during an emergency and/or recovery phase is as follows.

Central Waste Complex Spill Control Equipment		
Type	**Location**	**Capability**
Spill control kit	2401-W, 2402-W, 2402-WD, 2402-WH, 2402-WK 2403-WA North of 2404-WC Staging area	Cleanup organic solvents, inorganic solvents, acids, caustics, oxidizers, and polychlorinated biphenyl (PCB) spills; Radiation rope and signs

9.6 INCIDENT COMMAND POST

Buildings MO-720 and MO-438 contain areas for use in an emergency.

10.0 COORDINATION AGREEMENTS

RL has established a number of coordination agreements, or memoranda of understanding (MOU), with various agencies to ensure proper response resource availability for incidents involving the Hanford Site. A description of the agreements is contained in DOE/RL-94-02, Table 3-1.

11.0 REQUIRED REPORTS

Post-incident written reports are required for certain incidents on the Hanford Site. The reports are described in DOE/RL-94-02, Section 6.1.

12.0 PLAN LOCATION

Copies of this plan are maintained at the following locations:

- MO-720 Conference Room
- Office of the BED and alternate
- RL-EOC
- Hanford Local Area Network (HLAN)
- MO-288.

NOTE: In accordance with coordination agreements, the Hanford Fire Department provides direction during onsite event response and provides all needed information to support agencies that may be assisting the onsite responses. Therefore, only copies of plans for facilities where offsite agencies are the initial responders (e.g., 1163 Stores Building) will be provided to offsite support agencies.

13.0 BUILDING EMERGENCY ORGANIZATION

The complete building emergency organization listing of positions, names, work locations, and telephone numbers for the CWC is maintained in a separate, internally controlled document. Copies are distributed, at a minimum, to appropriate facility locations and to Hanford Site Emergency Preparedness. In addition, names and work and home telephone numbers of the BEDs and alternates are available from the Patrol Operations Center (373-3800), in accordance with the *Hanford Facility RCRA Permit*, Dangerous Waste Portion, General Condition II.A.4.

14.0 REFERENCES

DOE/RL-94-02, *Hanford Emergency Response Plan*, as amended.

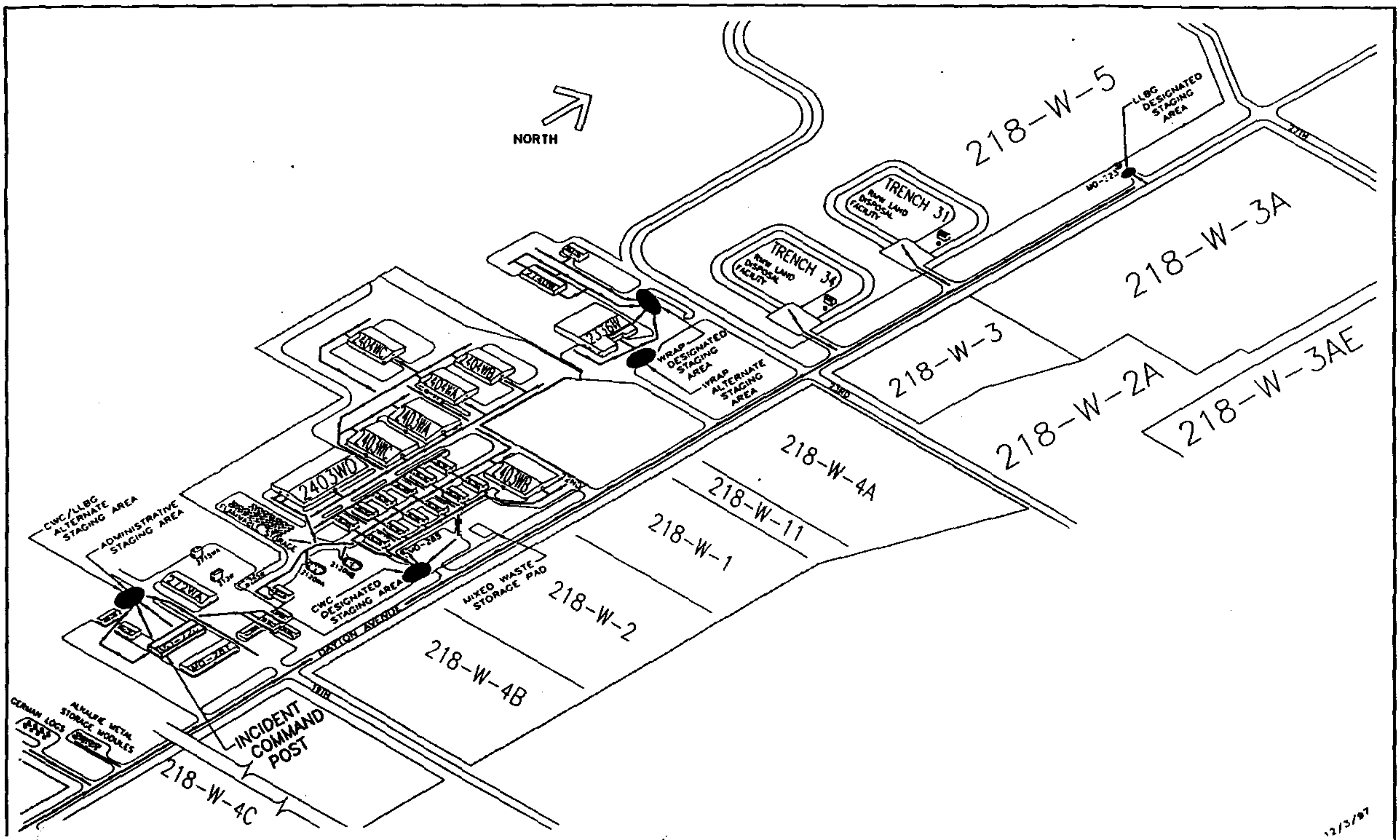
DOE Order 232.1, "Occurrence Reporting and Processing of Operations Information," U.S. Department of Energy, Washington D.C.

NIOSH, 1996, *Pocket Guide to Chemical Hazards*, National Institute of Occupational Safety and Health, U.S. Department of Health and Human Resources, Public Health Service, Centers for Disease Control, Washington, D.C.

WAC 173-303, "Washington State Dangerous Waste Regulations," *Washington Administrative Code*, Washington State Department of Ecology, Olympia, Washington, as amended.

Hanford Facility RCRA Permit, Dangerous Waste Portion, Washington State Department of Ecology, Olympia, Washington, as amended.

Figure 1. Overview of the Central Waste Complex



ATTACHMENT A

Listing of Procedures and Guides

<u>Site-Wide Procedures</u>

DOE-0223, *Emergency Plan Implementing Procedures*, RLEP-3.4, "Emergency Termination, Reentry, and Recovery"

DOE-0223, *Emergency Plan Implementing Procedures*, RLEP-1.1, "Hanford Incident Command System and Event Recognition and Classification"

<u>Facility Specific Emergency Response Guide</u>

HNF-IP-1294, *Solid Waste Management Emergency Response Guide*

NOTE: The *Solid Waste Management Emergency Response Guide* provides more detailed response direction for all emergencies identified in Chapter 7.0 of this Building Emergency Plan.

APPENDIX 8A

TRAINING

R. W. Reddinger
R. W. Reddinger, Manager
Training

5/21/99
Date

R. Barmettlor
R. B. Barmettlor, Manager
Solid Waste Project

5/24/99
Date

Brett M Barnes
B. M. Barnes, Environmental Compliance Officer
Solid Waste Project

5/21/99
Date

CONTENTS

1.0 PURPOSE

This document outlines the Dangerous Waste Training Program (DWTP) for the Central Waste Complex (CWC) organization. CWC is permitted as a treatment, storage, and/or disposal (TSD) unit on the Hanford Facility. The DWTP implements the requirements of Washington Administrative Code (WAC) 173-303-330 and Title 40 Code of Federal Regulations (CFR) 264.16 for the development of a written dangerous waste training plan.

2.0 SCOPE

This DWTP applies to personnel who perform work at, or in support of, CWC. The DWTP requirements are based on an assessment of duties and responsibilities of personnel responsible for dangerous waste management (handling, treatment, storage, and/or disposal of dangerous and/or mixed waste). In addition, this training program ensures that personnel are familiar with emergency equipment and/or systems and emergency procedures to safely operate and maintain the CWC.

3.0 DEFINITIONS

NONE

4.0 RESPONSIBILITIES

Personnel responsibilities are described in the following sections.

4.1 Facility Manager

The Facility Manager has the overall responsibility to meet all training requirements of WAC 173-303-330 and Condition II.C of the Hanford Facility RCRA Permit (Ecology 1994). To meet the requirements in WAC 173-303-330(1)(a), the training director position is described in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28, Chapter 8.0). Because the Facility Manager has overall responsibility in the assignment of training for personnel, the Facility Manager is involved in directing training at CWC.

4.2 Training Manager

The training manager has overall responsibility for establishing, conducting, and administering the training program for CWC to ensure personnel are trained to meet their assigned jobs.

4.3 Facility Management

Managers, under the direction of the Facility Manager, are responsible for the following:

- Determining required training for all personnel assigned to CWC, as required by job assignment.
- Ensuring that personnel assigned to CWC receive required initial training, continuing training, and retraining as needed to be qualified to perform their assigned duties in dangerous waste management.
- Maintaining up-to-date personnel training records for assigned personnel.

4.4 Training Personnel

Training personnel are responsible for the following:

- Reviewing training requirements whenever regulations change or annually, at a minimum, for adherence to regulations and to ensure the requirements reflect the current systems, procedures, and policies applicable to each position.
- Developing and conducting training on new and existing systems or equipment.

4.5 Central Waste Complex Personnel

CWC and CWC support personnel are responsible for the following:

- Working with their managers to define applicable training
- Completing necessary training to gain/maintain qualifications.

5.0 TRAINING PROGRAM

The CWC DWTP is implemented based on training requirements related to job responsibilities.

5.1 Training Requirements

Training requirements for individual personnel are tracked in the Training Matrix (TMX).

The responsible manager reviews training requirements when personnel change positions or assume new job responsibilities, when changes are identified to this training plan (other than editorial changes), or annually, as a minimum. Updates to the training requirements are made as necessary.

Personnel must meet the training requirements within 6 months of the date of hire, within 6 months of assignment to CWC, or within 6 months of assignment to a new position within the CWC. Personnel in-training will not make decisions that could affect facility safety. Personnel independently can perform specific jobs or tasks for which they are qualified. Personnel performing work who do not meet all training requirements must be supervised by a qualified person.

As new requirements are identified and indicated in this training plan, CWC personnel will comply with the new requirements within 6 months of the effective date of the requirement.

5.2 Job Titles and Descriptions

Personnel are assigned a job title and a job description. The job description includes requisite skills, work experience, education, and other qualifications, and a brief list of duties and/or responsibilities. This information is maintained by the human resources department.

5.3 Dangerous Waste Worker Position

CWC personnel are categorized into six worker positions: (1) All Employee, (2) General Worker, (3) Advanced General Worker, (4) General Manager, (5) General Shipper, and (6) Waste Designator.

Personnel are categorized into these positions based on duties and responsibilities as determined by a job analysis or management assessment. In the event personnel duties and responsibilities fall into more than one position, personnel will complete the training requirements for each position.

The duties and responsibilities described for the positions in this section, coupled with the information described in Section 5.4, provide the necessary information to determine the training for appropriate personnel. The categories are based on duties and responsibilities of personnel associated with dangerous waste management at CWC and are provided in the following sections.

5.3.1 All Employee

Personnel included in this position are those who do not fall into one of the other five positions <u>and</u> have no duties or responsibilities directly associated with dangerous waste management. Typical job titles of personnel in this position include secretaries, clerks, and oversight personnel.

Most visitors, categorized as All Employee, generally tour, provide oversight, or are brought onsite for interviews. Other non-Hanford Facility personnel who gain access to the CWC to complete work in controlled areas but do not become involved in the management of dangerous waste are categorized as All Employee.

5.3.2 General Worker

Personnel with limited dangerous waste management duties, such as activities associated with the generation of dangerous waste or facility maintenance or modification, are categorized as General Workers. Typical job titles of personnel in this position include maintenance personnel, health physics technicians, and transporters.

Personnel categorized as General Workers could be assigned duties and responsibilities for the following:

- Placing waste into pre-approved containers and filling out log sheets where applicable
- Completing radiological surveys of dangerous waste
- Moving containers or loading packaged containers onto trucks
- Responding to a spill or release of known contents where duties and responsibilities are limited to containing the spill/release, returning the container to an upright position, and/or placing the known spilled material or waste into a pre-approved container.
- Applying container markings or labels based on direction from an Advanced General Worker, General Manager, or General Shipper.

5.3.3 Advanced General Worker

Personnel whose duties exceed those of a General Worker for dangerous waste management are categorized as Advanced General Workers. The typical job title of personnel in this position is Nuclear Process Operator.

Responsibilities of an Advanced General Worker for management of dangerous waste in containers can include the following:

- Determining container markings and labels
- Preparing container log sheets
- Completing waste inventories
- Sampling of waste
- Packaging and transporting waste samples
- Responding to spills and releases of waste in accordance with approved procedures
- Performing inspections and surveillances
- Receiving transfers and/or shipments of waste.

5.3.4 General Manager

Personnel identified as General Managers coordinate, direct, and oversee the work of General or Advanced General Workers in the management of dangerous waste or in the operation and control of CWC. Other duties could include responsibilities during emergency events requiring implementation of the building emergency plan. Personnel at the CWC who could be categorized as General Managers include: the operations manager (OM), team leads (TLs), environmental compliance officer (ECO), cognizant engineers (Cog Engrs), persons in charge (PIC), hazardous material specialist (HMS), and building emergency director (BED). The TMX identifies personnel currently filling these positions.

5.3.4.1 Operations Manager

OM responsibilities include the following:

- Supervising, coordinating, and directing the activities of the TLs

- Maintaining control over the CWC operations in accordance with established operating procedures and policies, DOE Orders, and federal and state regulations

- Directing, controlling, and coordinating the storage and transfer of dangerous waste

- Complying with CWC permits

- Providing guidance to TLs during abnormal or emergency conditions.

5.3.4.2 Team Leads

TLs responsibilities include the following:

- Supervising and coordinating CWC operation and maintenance activities

- Maintaining control of CWC operations in accordance with established policies and operating procedures, DOE Orders, and federal and state regulations

- Conducting pre-job safety meetings with personnel

- Maintaining operational records

- Reviewing and revising CWC operations procedures
- Recognizing and responding to abnormal and/or emergency conditions
- Supervising the storage, handling, and transfer of dangerous and/or mixed waste
- Complying with CWC permits.

5.3.4.3 Environmental Compliance Officer

ECO responsibilities include the following:

- Ensuring CWC management is aware of environmental compliance requirements and issues
- Providing support to ensure compliance with applicable environmental rules and regulations
- Serving as CWC liaison on environmental issues and permits
- Advising CWC management of emerging environmental requirements and policies, and recommending implementation strategies to ensure compliance
- Ensuring compliance with CWC permits.

5.3.4.4 Cognizant Engineers

Cog Engrs responsibilities include the following:

- Ensuring emergency and monitoring equipment, process equipment, procedures, designs, etc., comply with DOE Orders, federal and state regulations, national standards, and applicable engineering procedures and management standards
- Issuing and maintaining operation documentation, operating procedures, flowsheets, specifications, process test plans and procedures, operational safety requirements, etc..
- Performing evaluations of CWC process to ensure compliance with process control requirements and permits
- Preparing and approving engineering design documents and drawings in compliance with applicable policies, procedures, and instructions per national standards and codes
- Providing technical assistance for hazardous material and dangerous waste spill response.

5.3.4.5 Person In Charge

PIC responsibilities include providing in-field direction of tasks in progress.

5.3.4.6 Hazardous Material Specialist

HMS responsibilities include the following:

- Supervising and coordinating hazardous waste storage and transfer
- Providing approved storage containers and applicable markings
- Interfacing with other organizations to ensure proper and timely disposal of hazardous waste
- Preparing and maintaining applicable hazardous waste documentation in accordance with DOE Orders and federal and state regulations
- Ensuring non-regulated alternatives are used whenever possible
- Reviewing hazardous waste documentation and providing hazardous waste disposition instructions as required.

5.3.4.7 Building Emergency Director

BED responsibilities include the following:

- Acting as the emergency coordinator
- Assessing incidents to determine response necessary to protect the personnel, facility, and the environment
- Arranging for care of any injured personnel
- Remaining available for fire, patrol, and other authorities on the scene, and provides all required information
- Ensuring proper containerization, packaging, and labeling of recovered spill materials
- Assisting in preparing the necessary post-incident documentation.

5.3.5 General Shipper

Personnel who prepare and sign waste movement documentation for both onsite transfers or offsite shipments of dangerous waste are categorized as General Shipper.

5.3.6 Waste Designator

Personnel who perform and/or complete waste designations are categorized as a Waste Designator.

5.4 Required Training

Attachment 1 is a matrix of required RCRA training courses. Training for emergency procedures, emergency equipment, and emergency systems to meet the requirements of WAC 173-330(1)(d) is included in these courses as specified in the course description. Attachment 2 provides required training for personnel by job category.

Personnel who have completed training offsite are required to provide a certificate or other suitable evidence of training course(s) that meet the requirements of WAC 173-303 and this plan.

5.5 Non-Hanford Facility Personnel

Non-Hanford Facility personnel who perform work at CWC must complete the appropriate level of training determined by line management according to the tasks they will perform.

CWC management is responsible for ensuring that non-Hanford Facility personnel training requirements are met before granting access. Some personnel are granted access without the required training because they are either escorted or supervised by qualified personnel within CWC.

5.6 Conduct of Training

The training program uses a systematic approach to training. Training design, development, and implementation are based on learning objectives derived from the analysis of the specific job/task. Training is provided using classroom instruction, on-the-job training, required reading, computer-based training methods, and/or by providing drills. Training is developed and provided by personnel knowledgeable in dangerous waste management policies and/or procedures.

5.7 Documentation of Training

Classroom training is documented on course completion rosters, which are signed by students attending the course. Written examinations are signed by the student at the time of taking the exam and when reviewed with the instructor who grades the examination.

Training record files for CWC personnel are stored in the TMX computer database, which is accessed by the Facility Records Specialist. A report is generated from the database to inform CWC management when training for personnel is within 90 days of expiration. An example of a TMX report is included in Attachment 3. Copies of completed TSD unit-specific training certifications/qualifications are available from the WMH training department. Additional information regarding training records can be accessed through the Human Resources Information System (HRIS). The HRIS is managed by the Hanford Training Records organization.

Training records summaries for support organization personnel are also stored in the HRIS. Training records for former personnel are kept on the HRIS for 3 years from the date last worked at the CWC. Original signed and dated training records are maintained by the Hanford Training Records organization. These records are transferred quarterly to the Records Holding Facility in Richland, Washington. After approximately one year at the Records Holding Center, the original training records are archived.

5.7.1 Access of Training Records

When a training record is requested during an inspection, an electronic data storage record will be provided. If an electronic data storage record does not satisfy the inspection concerns, a hard copy training record will be provided. Training records of former personnel may not be readily available to CWC personnel and may require a representative from the Training Records organization to access this information.

5.7.2 Determining Current Training Status

The electronic data storage training record, coupled with this training plan, will give the ability to quickly determine the training status of personnel in the field.

5.7.3 Personnel List

A list of personnel for Advanced General Workers, General Managers, General Shippers and Waste Designators is maintained on TMX, including the direct link between these positions and the individuals filling the positions. The TMX is updated quarterly.

6.0 REFERENCES

DOE/RL, 1994, DOE-RL/U.S. Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE94NM-063" dated April 14, 1994, items 3 and 4.

DOE/RL-91-28, *Hanford Facility Dangerous Waste Permit Application, General Information Portion*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, 1994, *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste*, Washington State Department of Ecology, Olympia, Washington, modified periodically.

7.0 ATTACHMENTS

ATTACHMENT 1. RCRA TRAINING PROGRAM COURSE DESCRIPTIONS

ATTACHMENT 2. REQUIRED TRAINING FOR CENTRAL WASTE COMPLEX PERSONNEL

ATTACHMENT 3. EXAMPLE OF TMX DATABASE REPORT

ATTACHMENT 1. RCRA TRAINING PROGRAM COURSE DESCRIPTIONS

The following constitute the RCRA training program courses as determined by (1) WAC 173-303, (2) the Hanford Facility RCRA Permit, and (3) correspondence between DOE-RL and Ecology on dangerous waste training.

Title	**000001 Hanford General Employee Training**
Description	Course covers DOE Orders and applicable policies pertaining to employer and personnel rights and responsibilities, general radiation training, hazard communications, dangerous waste, fire prevention, personal protective equipment, safety requirements, emergency preparedness, accident reporting, and avenues for addressing safety concerns.
Mandating document(s)	Hanford Facility RCRA Permit, General Condition II.C.2 and II.C.4.
Target audience	All Hanford Facility personnel working on the Hanford Facility.
Frequency	Annual.

Title	**02006G Waste Management Awareness**
Description	Course introduces personnel to federal laws governing chemical safety in the work place. The course provides the hazardous material/waste worker with the basic fundamentals for safe use of hazardous materials and initial accumulation or storage of dangerous or mixed waste in containers. The concepts covered in this course instruct personnel on specific waste generation procedures and requirements, which include: (1) applicable waste management practices (i.e., waste stream identification, waste segregation practices, completing container logsheets, and housekeeping requirements), (2) proper responses to incidents pertaining to the waste in the accumulation containers, (3) proper responses to dealing with waste of unknown origins, and (4) proper responses to questions posed in the field concerning the above elements.
Mandating document(s)	WAC 173-303-330(1) Letter: DOE-RL/U.S. Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Conditions II.C.1 and II.C.4.
Target audience	Hanford Facility personnel categorized as a General Worker, Advanced General Worker, and General Manager. Subcontractors categorized as General Workers. Other courses may provide equivalent training so that credit for this course is provided when the electronic data storage training record is generated.
Frequency	One-time only. [Annual refresher training is not required because training is adequately covered through 035110 and/or 301100 (03E047).]

Title	**020159 Advanced Course 2 - Hazardous Waste Shipper Certification**
Description	Course defines responsibilities and liabilities with regard to compliance to manifesting requirements and U.S. Department of Transportation regulations, including placarding, identifying proper shipping names, and loading requirements.
Mandating document(s)	WAC 173-303-330(1), -180, -190, and -370. Hanford Facility RCRA Permit, General Condition II.Q, as applicable
Target audience	General Shippers of dangerous or mixed waste on roadways anywhere on the Hanford Facility.
Frequency	Every 3 years.

Title	**02028B Building Emergency Director Training**
Description	Course provides an overview of the responsibilities of the Building Emergency Director, identifies the building emergency organizations and actions required during an event, discusses implementing the contingency plan, and discusses drill and exercise requirements.
Mandating document(s)	WAC 173-303-330(1), -340, -350, and -360.
Target audience	Hanford Facility personnel categorized as General Managers because they perform the responsibilities of a RCRA Emergency Coordinator through the title of Building Emergency Director or alternate (e.g., On-Call Manager).
Frequency	Initial (retrained annually by 037510 Building Emergency Director/Warden Requalification).

Title	**300900 Solid Waste Project Facility Orientation**
Description	Introduction to the Solid Waste Project including mission, layout, hazards, and emergency response procedures.
Mandating document(s)	WAC 173-303-330 Hanford Facility RCRA Permit, General Condition II.C.
Target audience	All personnel assigned to, or working at, Central Waste Complex.
Frequency	One-time only.

Title	**300910 Solid Waste Management Operator Certification**
Description	Course provides nuclear process operators with an overview of waste management facilities, activities, and conduct of operations.
Mandating document(s)	WMH-200, Section 5.1, DOE Order 5480.20A
Target audience	Operations personnel categorized as Advanced General Workers
Frequency	Every 2 years.

Title	**300925 Solid Waste Project Management Storage Operator Certification**
Description	*Qualifies nuclear process operators to operate the systems associated with the* CWC including management of waste in containers.
Mandating document(s)	WAC 173-303-330, -630.
Target audience	Operations personnel categorized as Advanced General Workers.
Frequency	Every 2 years.

Title	**300930 Solid Waste Project Management Disposal Operator Qualification**
Description	Course qualifies nuclear process operators to operate the systems associated with the mixed waste trenches including management of waste in containers, tanks, and landfills.
Mandating document(s)	WAC 173-303-330, -665
Target audience	Operations personnel categorized as Advanced General Workers.
Frequency	Every 2 years.

Title	**035010 Waste Designation**
Description	Course teaches dangerous waste designation according to WAC 173-303. Class content includes section-by-section lecture on the regulations, with examples following each section. Students complete examples using a waste designation flow chart. Examples addressed include: listed waste, characteristic waste, and Washington State criteria of toxicity and persistent.
Mandating document(s)	WAC 173-303-330(1), -070, and -080 through -100.
Target audience	General Shippers and Waste Designators.
Frequency	One-time only. (Annual retrain is only required for those personnel who are required to complete 035012.)

Title	**035012 Waste Designation Qualification**
Description	Course provides qualification to be a Waste Designator.
Mandating document(s)	WAC 173-303-330(1), -070, and -080 through -100.
Target audience	Waste Designators.
Frequency	Annual.

Title	**035020 Facility Waste Sampling and Analysis**
Description	Course presents waste sampling methodologies according to U.S. Environmental Protection Agency Protocols SW-846, "Test Methods for Evaluating Solid Waste Physical/Chemical Methods". This course also covers documentation requirements in a sampling plan and/or waste analysis plan, field and laboratory quality control/assurance, the data quality objectives process, and use of actual sampling equipment as specified by WAC 173-303-110. Finally, topics on listed waste management pertaining to sample management and available onsite sampling services are covered.
Mandating document(s)	WAC 173-303-330(1), -070, -110, and -300.
Target audience	General Managers and/or General Shippers because they perform responsibilities for sampling waste or effluent streams.
Frequency	One-time only.

Title	**035100 Container Waste Management - Initial**
Description	Course covers general training requirements pertaining to waste management of container in less-than-90-day accumulation areas and TSD units. The course incorporates WAC 173-303-200(1), -630, DOE Orders, and container management policy. Course includes practical exercises for hands-on experience with the packaging of dangerous or mixed waste, and preparation of packages for final destination. This course does not cover waste management aspects pertaining to other RCRA waste management units such as tank systems, surface impoundments, containment buildings, landfills, etc.
Mandating document(s)	WAC 173-303-330(1), -630, -200(1) and waste minimization.
Target audience	Advanced General Workers and General Managers, because they are immediate managers of or direct Advanced General Workers, who manage containers of dangerous or mixed waste.
Frequency	Initial (refresher annually by 035110 Container Waste Management Training).

Title	**035110 Container Waste Management - Refresher**
Description	Refresher Course for Container Waste Management - Initial.
Mandating document	WAC 173-303-330(1), -630, -200(1), and waste minimization.
Target audience	Advanced General Workers and General Managers categorized because they are immediate managers of or direct Advanced General Workers who manage dangerous or mixed waste in containers.
Frequency	Annual.

Title	**035120 Waste Management Administration - Initial**
Description	Course is designed for personnel preparing to become shippers of dangerous and/or mixed waste. This course covers regulatory and onsite policies, forms, reports, forecasts, and plans. Topics also covered include: waste characterization, waste certification summaries, waste specification system, and solid waste storage/disposal records. In addition, students learn how these forms are used to complete shipping papers.
Mandating document(s)	WAC 173-303-330(1), -630, -200, -210, -220, -380, and -390.
Target audience	General Shippers categorized because they direct Advanced General Workers in the management of containers of dangerous and mixed waste.
Frequency	Initial (refresher annually by 035130 - Waste Management Administration).

Title	**035130 Waste Management Administration - Refresher**
Description	Refresher course for Waste Management Administration - Initial.
Mandating document(s)	WAC 173-303-330(1), -630, -200, -210, -220, -380, and -390.
Target audience	General Shippers categorized because they direct Advanced General Workers in the management of containers of dangerous and mixed waste.
Frequency	Annual.

Title	**037510 Building Emergency Director/Warden Requalification**
Description	Refresher for Building Emergency Director Training.
Mandating document(s)	WAC 173-303-330, -340, -350, and -360.
Target audience	General Managers categorized because they have the responsibilities of the RCRA Emergency Coordinator in WAC 173-303-360.
Frequency	Annual.

Title	**301100 (03E047) Facility Emergency and Hazard Information Checklist for Solid Waste Project**
Description	Course consists of a review of specific chemical hazards associated with operating the Central Waste Complex, as covered by the Central Waste Complex Building Emergency Plan. The training is completed by the supervisor, manager, or a designated individual using a checklist. Information reviewed includes hazards in the work area and emergency response requirements, including communication and alarm systems, response to groundwater contamination incidents, and response to fires. The training is completed by the immediate manager or a designated individual using a checklist.
Mandating document(s)	WAC 173-303-330(1)(d), -340, -350, and -360.
Target audience	Central Waste Complex personnel categorized as General Workers, Advanced General Workers, and General Managers.
Frequency	Annual.

ATTACHMENT 2. REQUIRED TRAINING FOR CENTRAL WASTE COMPLEX

Position	Job Title	Required Training
All Employee	All other Job Titles not specifically listed.	000001, 300900
General Worker	Radiological Control Technician, Maintenance Personnel (Electrician, Instrument Technician, Insulator, Millwright, Painter, Pipefitter, Power Operator, Process Crane Operator, Rigger, Sign Painter, Truck Driver, Welder), Maintenance Manager, Radiological Control Manager.	000001, 02006G, 301100 (03E047), 300900
Advanced General Worker	Nuclear Process Operator	000001, 02006G, 035100/035110, 301100 (03E047), 300925, 300900, 300910, 300925, 300930
General Manager	Operations Manager/Team Leader	000001, 02006G, 02028B, 037510 035100/035110, 301100 (03E047), 300900
	Environmental Manager/Team Leader	000001, 02006G, 035010, 035020, 035100/035110, 301100 (03E047), 300900
	Environmental Compliance Officer	000001, 02006G, 035010, 035020, 035100/035110, 301100 (03E047), 300900
	Environmental Engineer/Scientist Plant Engineer (Environmental)	000001, 02006G, 035010, 035020, 035100/035110, 301100 (03E047), 300900
	Hazardous Material Specialist	000001, 02006G, 035010, 035020, 035100/035110, 301100 (03E047), 300900
	Building Emergency Director	000001, 02006G, 02028B/037510, 035100/035110, 301100 (03E047), 300900

Position	Job Title	Required Training
General Shipper	Shipper	000001, 02006G, 020159, 035010, 035100/035110, 035120/035130, 301100 (03E047), 300900
Waste Designator	Waste Designator	000001, 035010, 035012, 301100 (03E047), 300900

ATTACHMENT 3. EXAMPLE OF TMX DATABASE REPORT

POSITION TRAINING REPORT

Tracking Code: Matrix Last Modified on 05/03/99 05/05/99 Position 1
Manager: 30 Days Delinquent Forecast 15:04:38 Sheet 1 of 1
Organization: SOLID WASTE MANAGEMENT
Position: Safety Engineer (AE)

Course No.		Title	Retrain Course	Individual #1	Individual #2
M	000001	HGET	000001	02/04/99	04/20/99
M	003034	LOCK & TAG - AUTH WRKR I	003037	02/25/99	03/05/99
M	003035	LOCK & TAG: CO INITIAL	003036	02/25/99	03/05/99
M	020001	RAD WORKER II INITIAL	020003	12/16/00	01/20/01
M	020041	RESPIRATORY PROTECTION I	02R041	07/14/99	09/15/99
M	031110	24 HR RCRA TSD HAZ WASTE	032020	01/14/99	08/28/99
M	03E306	WRAP FACILITY EMERG & CH	03E306	10/14/99	12/15/99
M	300900	SW PROJECTS FACILITY ORI	---------	08/21/99	02/02/00
M	301100	SW PROJECT EMER/HAZ INFO	301100	08/21/99	02/02/99
M	306750	WRAP1 FAC ORIENT	306750	10/14/98	02/10/99
M	020130	CONFND SPC ENTRY (CSE)	---------	OK	OK
M	020140	FALL PROTECTION TRAINING	---------	OK	OK
M	020044	QUANTITATIVE MASK FIT	020044	12/15/99	02/20/00
M	02006G	WASTE MANAGEMENT AWARENE	---------	OK	OK
M	038100	HANFORD INCIDENT COMMAND	038100	7/16/99	9/15/99
M	020900	ALARA TRNG TECH SUPPORT	---------	OK	OK
M	120196	COMPUTER SECURITY TRAINI	120195	12/25/99	02/02/00
M	170500	BASIC MEDIC FIRST AID	170535	12/25/99	03/11/01
M	172701	ISMS & WORK PLANNING TEA	---------	OK	OK
M	172702	USING THE AJHA TOOL	---------	OK	OK
M	020702	RAD WORKER REFRESHER TRA	020702	03/21/00	02/02/01

Legend:

Upper case (M/R)	= Course needed by all	Date	= Course retrain date
Lower case (m/r)	= Course needed by some	OK	= Course taken; no retrain date required
<< >>	= Course delinquent	Blank	= Course not needed (lower case) and not taken
/ /	= Course needed (upper case) but not taken	****	= Course taken; retrain requirement not maintained

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Enclosure 8
Selecting a Laboratory and Quality Assurance/Control
(Attachment 45)

Attachment 45

5.0 SELECTING A LABORATORY AND QUALITY ASSURANCE/QUALITY CONTROL

The quality assurance (QA) and quality control (QC) requirements outlined in this section are applicable to laboratory activities governed by this waste analysis plan (WAP). The selection of any laboratory shall be based upon its ability to demonstrate compliance to this section. Experience and capabilities will be determined in three major areas:

(1) Comprehensive written QA/QC program that conforms to the requirements of this section

(2) Laboratory is periodically audited for effective implementation of QA/QC program by a group or agency deemed acceptable by the TSD unit operating organization

(3) Participation and demonstrated proficiency in a performance-evaluation program acceptable to the TSD unit operating organization.

All laboratories providing analytical support to the TSD unit operating organization are required to have the following QA/QC documentation.

- Analytical data generated are controlled by the implementation of a documented laboratory QA program that meets the requirements of this section.

- Before commencement of analytical work, the laboratory staff will submit the QA plan for review by the TSD unit operating organization. At a minimum, the QA plan shall address the following:

  - sample custody and management practices (see also Section 4.2 of this WAP)
  - sample preservation protocols
  - sample preparation and analytical procedure requirements
  - instrument maintenance and calibration requirements
  - internal QC measures, e.g., method blanks, spikes

When it is necessary to send samples to a laboratory, contracts or work agreements are not awarded until a pre-award evaluation of the prospective laboratory has been performed. In the pre-award evaluation process, the laboratory's QA plan is submitted to the TSD unit operating organization for approval. QA personnel and a technical expert also visit the laboratory and/or evaluate the following documentation: copies of the prospective laboratory's QA/QC documents and records of surveillances/inspections, audits, non-conformances, and corrective actions.

5.1 OBJECTIVES FOR TSD UNIT

The primary purpose of waste testing is to ensure that the waste is properly characterized, when process knowledge is insufficient, in compliance with RCRA requirements for general waste analysis [WAC 173-303-300(2); 40 CFR 264.13]. Waste also is tested to ensure that stored waste is safely managed, residuals from spills that might occur are properly disposed of, and the process of accepting waste for storage is controlled. The specific objectives of the waste-sampling and analysis program at TSD unit are as follows:

- Identify whether waste is compatible with waste currently stored.

- Provide a detailed chemical and physical analysis of a representative sample of the waste before the waste is accepted at or transferred from a TSD unit to an offsite TSD facility to ensure proper management and disposal.

- Provide an analysis that is accurate and up-to-date to ensure that waste is properly treated.

- Ensure safe management of waste at the TSD unit.

- Ensure proper disposal of residuals.

- Ensure compliance with Land Disposal Restriction (LDR) requirements.

- Identify waste that does not meet TSD unit acceptance requirements (e.g., incomplete information).

- Identify waste that does not meet TSD unit specifications (e.g., Part A, Form 3 Permit Application, restricted from management at TSD unit).

- Determine if waste samples are representative of the contents of the containers at the time the samples were taken.

- Determine if waste accepted for management meets the information provided by the generator.

5.2 DATA QUALITY REQUIREMENTS

The overriding goal of this program is to adequately designate or certify waste, through either acceptable knowledge or analytical testing, such that it can be appropriately managed or dispositioned. The first objective is to control and characterize any errors associated with the data produced in the laboratory. Laboratory QC activities are directed at identifying any potential errors introduced during the preparative, analytical, and/or reporting phases of work. Other oversight QA activities, such as planning the field and laboratory QC program requirements, auditing ongoing and completed activities, and evaluation of certifications obtained by the laboratory, ensure that the specified procedures are followed and that the QA information needed for characterizing error, to permit adequate decision-making, is obtained.

The second objective is to illustrate that waste has been tested according to the specifications in this WAP. Activities related to this objective include, but are not limited to, the following:

- Inspections – performed by the TSD unit operating organization, depending on the activity. The inspections primarily are visual. The purpose of these inspections is to verify that a specific guideline, specification, or procedure for the activity is completed successfully.

- Laboratory analyses – performed by onsite or offsite laboratories on samples of waste. The purpose of the laboratory analyses is to determine constituents or characteristics present, the concentration or level, and result in designation/certification.

- Checklists – required for inspections and designed to ensure that the appropriate areas are addressed, consistently. Checklists are filled out during the course of inspection to document inspection results.

- Instrument calibration and calibration verification activities – required for ensuring data of known accuracy and precision. This activity includes maintaining records of calibration of all instruments used to perform field and laboratory analyses to ensure traceability to reported results.

5.2.1 Data Assessment

The acquired data need to be scientifically sound, of known quality, and thoroughly documented. Data validation is not required; however, the TSD unit operating organization is responsible to ensure that data assessment or evaluation is completed. Data are assessed to determine compliance with quality standards established by the Washington State Department of Ecology (Ecology) and this Permit, which are as follows:

Precision – The overall precision shall be the agreement between the collected samples (duplicates) for the same parameters, at the same location, subjected to the same preparative and analytical techniques. Analytical precision shall be the agreement between individual test portions taken from the same sample, for the same parameters, subjected to the same preparative and analytical techniques.

Accuracy – Accuracy of the measurement system shall be evaluated by use of various kinds of quality assurance samples, including, but not limited to, certified standards, in-house standards, and performance evaluation samples.

Representativeness – Representativeness will address the degree to which the data accurately and precisely represent a real characterization of the waste stream, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness will be addressed for the following points:

- Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations is selected.

- The representativeness of selected media has been defined accurately.

- The sampling and analytical methodologies are appropriate.

- The environmental conditions at the time of sampling are documented.

Completeness – Completeness is the amount of usable data obtained from a measurement system compared to the total amount of data requested.

Comparability – Comparability is the confidence with which one data set can be compared to another. This usually is accomplished by using standard methods.

5.3 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

All analytical work shall be defined and controlled by a Statement of Work, work order, or other documentation prepared in accordance with this section. Samples will be handled according to management approved laboratory procedures, according to any conditions of this Permit. The accuracy, precision, and any limitations of analytical data generated in the laboratory will be determined by QC performance.

5.3.1 Analytical Methods

As needed, the TSD unit operating organization will conduct analyses to determine completeness of information and whether waste meets the acceptance criteria for treatment, storage, or disposal at one of the Hanford Facility TSD units or those of a chosen offsite TSD facility. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information.

Testing shall be performed by chemists and/or appropriate analytical personnel working under a QA program. Analytical methods may be selected from those that are used routinely by the laboratories and suitable for the matrix and analyte(s) being tested. All methods employed by the laboratory for analysis of waste managed in the TSD unit shall be agreed upon by the TSD unit operating organization before the start of work.

Laboratories performing work to support the TSD unit operating organization shall have a system in place and documented, which ensures that procedures are properly prepared, reviewed, approved, issued, and controlled. Procedures shall be controlled such that only the most current version is available for use.

For parameters or methods not otherwise specified in the Permit, the following are acceptable sources of testing methods (standard methods). These are listed in order of preference.

- Analytical methods cited in WAC 173-303
- The most recently promulgated version of Test Method for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, U.S. Environmental Protection Agency, Office of Solid Waste.
- Other current U.S. EPA methods, as applicable to the matrix under evaluation.
- Standard Methods for the Examination of Water and Wastewater, American Public Health Association (APHA), American Water Works Association, Water Environment Federation.
- Annual Book of ASTM Standards, American Society for Testing and Materials.
- AOAC Official Methods of Analysis, AOAC (Association of Official Analytical Chemists), International.
- Other widely accepted analytical methods, proprietary methods, and non-standard methods. These may be needed in special cases, e.g., to develop operational and safety related information.

For all methods, the method must be shown to be suitable for the matrix being tested and must be demonstrated to have specificity for the parameter or analyte in that matrix. Quality control parameters, including method detection limit, precision, and accuracy, must be measured and monitored in real-time to ensure that acceptable data are produced.

5.3.2 Quality Control Requirements

Quality control principles of SW-846 Method 8000B, Section 8.7 will be incorporated into laboratory procedures, including standard methods and modified methods. Additionally, modified methods will be qualified by a regulatory level detection study. This study is based on 40 CFR 136 method detection limit criteria and is run on seven (7) samples at the regulatory limit. The regulatory level detection study produces enough data for interim QC limits until the Method 8000B Section 8.7 required 20 samples are finished. At that point a modified method is then on the same QC schedule as a standard method. Although SW-846 Method 8000B Section 8.7 applies to organic analyses, this same approach to method QC will be applied to those inorganic parameters identified in Appendix A of this WAP. Alternative detection studies may be performed by the performing laboratory pending review and approval by the Washington State Department of Ecology.

The types of quality control required are as follows:

Method or Preparative Blanks – These blanks usually consist of laboratory reagent-grade water treated in the same manner as the sample (e.g., digested, extracted, distilled). They are prepared, analyzed, and reported as a standard sample would be reported. Method or preparation blanks indicate contamination from reagents or materials used. A blank is considered acceptable if (1) the concentration of any analyte of interest detected in the blank is 20 times lower then that of the samples or (2) the analyte of interest in the sample is less than 80% of the Regulatory Decision Limit.

Laboratory Control Sample – A reference material, similar in matrix to the samples, introduced into a process to monitor the performance of the system. It is used in place of a method or blank spike when the matrix warrants, and an adequate material is available.

Matrix Spike – An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs at the time of sample preparation. (Note: When the TCLP is conducted, spiking occurs after leaching at the time of digestion or extraction). Matrix spikes shall be performed on 5% of the samples (1 in 20) or one per batch of samples. The Matrix Spike gives an indication of any limitations of the preparative process employed for the matrix tested. Wherever possible and practical, the sample should be spiked at a level which is at or near the regulatory decision limit. Generally, a matrix spike and matrix spike duplicate are prepared and analyzed in an organic analysis; inorganics include a sample, duplicate, and matrix spike. Accuracy limits for Matrix Spikes are specified in SW-846 Method 8000B, Section 8.7.1. Failure to achieve these limits for any analyte of interest warrants corrective action with the following exceptions: (1) the analyte of interest in the sample is so low in relation to the spike recovery that it would not exceed the regulatory decision limit or (2) the analyte of interest in the sample exceeds the regulatory decision limit. Appropriate corrective action is specified in SW-846 Method 8000B, Section 8.7. Laboratory performance-based limits may be used in lieu of those presented in SW-846 Method 8000B Section 8.7 if negotiated with Ecology.

Laboratory Duplicate Samples – Laboratory duplicates are obtained by removing two test portions from one field sample and analyzing each test portion as an independent sample. The analyses of laboratory duplicates monitor the precision of the preparative and analytical method for the sample matrix. Laboratory duplicates shall be performed on 5% of the samples (1 in 20) or one per batch of samples. In the case of testing for organic constituents, a matrix spike and matrix-spike duplicate are typically analyzed. Precision limits are established per SW-846 Method 8000B, Section 8.7. If the precision value exceeds the control limit, then corrective action is required with the following exceptions: (1) the sample results, regardless of precision, would not exceed the regulatory decision limit or (2) the sample results clearly exceed the regulatory decision limit, regardless of precision. Appropriate corrective action is established in SW-846 Method 8000B, Section 8.7. Laboratory performance-based limits may be used in lieu of those presented in SW-846 Method 8000B, Section 8.7 if negotiated with Ecology.

Enclosure 9
300 Area WATS Closure Plan
(Attachment 46)

DOE/RL-90-11
Revision 2
UC-630

300 Area Waste Acid Treatment System Closure Plan

Date Published
May 1999

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

RELEASE AUTHORIZATION

Document Number:	DOE/RL-90-11, Rev. 2
Document Title:	300 Area Waste Acid Treatment System Closure Plan

This document, reviewed in accordance with DOE Order 241.1, "Scientific and Technical Information Management," and DOE G 241.1-1, "Guide to the Management of Scientific and Technical Information," does not contain classified or sensitive unclassified information and is:

APPROVED FOR PUBLIC RELEASE

Christine Willingham
C. Willingham
Lockheed Martin Services, Inc.
Document Control/Information Release

5/17/99
Date

Reviewed for Applied Technology, Business Sensitive, Classified, Copyrighted, Export Controlled, Patent, Personal/Private, Proprietary, Protected CRADA, Trademark, Unclassified Controlled Nuclear Information.

300 AREA WASTE ACID TREATMENT SYSTEM CLOSURE PLAN

FOREWORD

The *Hanford Facility Dangerous Waste Permit Application* is considered to be a single application organized into a General Information Portion (document number DOE/RL-91-28) and a Unit-Specific Portion. The scope of the Unit-Specific Portion includes closure plan documentation submitted for individual, treatment, storage, and/or disposal units undergoing closure, such as the 300 Area Waste Acid Treatment System.

Documentation contained in the General Information Portion is broader in nature and could be used by multiple treatment, storage, and/or disposal units (e.g., the glossary provided in the General Information Portion). Whenever appropriate, 300 Area Waste Acid Treatment System documentation makes cross-reference to the General Information Portion, rather than duplicating text.

This *300 Area Waste Acid Treatment System Closure Plan* (Revision 2) includes a Hanford Facility Dangerous Waste Permit Application, Part A, Form 3. Information provided in this closure plan is current as of April 1999.

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DOCUMENT CONTENTS

APPENDICES

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METRIC CONVERSION CHART

Into metric units | Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.948	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force			**Force**		
pounds per square inch	6.895	kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

Please print or type in the unshaded areas only (fill-in areas are spaced for elite type, i.e., 12 character/inch).

FORM 3

DANGEROUS WASTE PERMIT APPLICATION

I. EPA/STATE I.D. NUMBER: W A 7 8 9 0 0 0 8 9 6 7

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (mo., day, & yr.)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA/STATE I.D. Number, or if this is a revised application, enter your facility's EPA/STATE I.D. Number in Section I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

MO.	DAY	YR.
0 3	2 2	4 3

*FOR EXISTING FACILITIES, PROVIDE THE DATE *(mo., day, & yr.)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

*The date construction of the Hanford Facility commenced.

☐ 2. NEW FACILITY *(Complete item below)*

MO.	DAY	YR.

FOR NEW FACILITIES, PROVIDE THE DATE *(mo., day, & yr)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION *(place an "X" below and complete Section I above)*

☒ 1. FACILITY HAS AN INTERIM STATUS PERMIT

☒ 2. FACILITY HAS A FINAL PERMIT

III. PROCESSES - CODES AND CAPACITIES

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the *(Section III-C)*.

B. PROCESS DESIGN CAPACITY - For each code entered in column A enter the capacity of the process.

1. AMOUNT - Enter the amount.
2. UNIT OF MEASURE - For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D80	GALLONS OR LITERS
LANDFILL	D81	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D82	*ACRES OR HECTARES*
OCEAN DISPOSAL	D83	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D84	GALLONS OR LITERS
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Section III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

EXAMPLE FOR COMPLETING SECTION III *(shown in line numbers X-1 and X-2 below)*: *A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.*

LINE NUMBER	A. PROCESS CODE *(from list above)*	B.1. AMOUNT *(specify)*	B.2. UNIT OF MEASURE *(enter code)*	FOR OFFICIAL USE ONLY
	300 Area Waste Acid Treatment System			
1	T 0 1	14,006	V	
2	S 0 2	16,505	L	
3	T 0 4	15,898	V	
4				
5	311 Tanks			
6				
7	T 0 1	18,927	V	
8	S 0 2	34,069	L	
9				
10				

Continued from the front.

III. PROCESSES (continued)

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESS (code "T04"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPAC

Refer to the following pages.

IV. DESCRIPTION OF DANGEROUS WASTES

A. DANGEROUS WASTE NUMBER - Enter the four digit number from Chapter 173-303 WAC for each listed dangerous waste you will handle. If you handle dangerous wastes which are not listed in Chapter 173-303 WAC, enter the four digit number(s) that describes the characteristics and/or the toxic contaminants of those dangerous wastes.

B. ESTIMATED ANNUAL QUANTITY - For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE - For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account t. appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed dangerous waste: For each listed dangerous waste entered in column A select the code(s) from the list of process codes contained in Section III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed dangerous wastes: For each characteristic or toxic contaminant entered in Column A, select the code(s) from the list of process codes contained in Section III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed dangerous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: DANGEROUS WASTES DESCRIBED BY MORE THAN ONE DANGEROUS WASTE NUMBER - Dangerous wastes that can be described by more than one Waste Number shall be described on the form as follows:

1. Select one of the Dangerous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other Dangerous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other Dangerous Waste Number that can be used to describe the dangerous waste.

EXAMPLE FOR COMPLETING SECTION IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. DANGEROUS WASTE NO. *(enter code)*	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE *(enter code)*	D. PROCESSES 1. PROCESS CODES *(enter)*	D. PROCESSES 2. PROCESS DESCRIPTION *(if a code is not entered in D(1))*
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2			T 0 3 D 8 0	*included with above*

 CONTINUE ON PAGE 3

FORM 3 DANGEROUS WASTE PERMIT APPLICATION
U.S. ENVIRONMENTAL PROTECTION AGENCY/STATE IDENTIFICATION NUMBER WA7890008967

Section III.C., Description of Process Codes Listed in Section III.A.

T01, S02, T04 - The 300 Area Waste Acid Treatment System (300 WATS) and Tank 40 began waste management operations in April 1973; auxiliary equipment and centrifuge operations began in November 1995. The 300 WATS was used for the treatment and storage of mixed waste generated during fuel fabrication operations in the 300 Area. The 300 WATS also was used for disposing of used and/or unneeded chemicals for other Hanford Facility operations. A portion of the waste initially was treated in two tanks (tanks 7 and 11) in the 333 Building to reduce the chromium (VI) to chromium (III). From May 1983 to January 1987, tanks 7 and 11 were used twice a year to treat up to 757 liters (200 gallons) per day of waste (T01). This waste, along with all other waste acid generated in the 333 Building, was drained to the 334-A Building and stored in two storage tanks (tanks B and C) (S02), with a combined volume of 15,142 liters (4,000 gallons). Previously, waste entered the 334-A Building passing through a settling tank [tank A, volume 1,363 liters (360 gallons)] before entering tanks B and C. Tank A ceased receiving waste in August 1984 when piping was disconnected to the tank and waste was routed directly to tanks B and C. Tank A was cleaned out and the polyvinyl chloride liner removed in 1988.

From startup in April 1973 until August 1973, the waste acid from the 333 Building was collected in a plastic-lined steel underground 14,385 liter (3,800 gallon) tank and a plastic-lined steel aboveground 22,712 liter (6,000 gallon) tank (tank 4) in the 334 Tank Farm. At that time, the underground tank developed a leak and was removed from service. The 334-A Building storage tanks replaced this underground tank in December 1974. Tank 4 was retained for emergency storage when the 313 Building neutralization activities were down for maintenance or modifications. Tank 4 usually was empty and when the tank was filled in January 1986, a leak developed near the top of the tank. Tank 4 was emptied and abandoned at that time. Tank 4 was removed, cleaned, and disposed of onsite in 1988.

The waste acid was pumped from the 334-A Building to the 313 Building where the waste acid underwent pH adjustment in a waste acid neutralization tank (tank 2) (T01). Tank 2 was capable of treating a maximum of 13,249 liters (3,500 gallons) per day of waste acid. The waste acid was pumped from tank 2 to tank 11 and then to a centrifuge where the waste acid underwent further treatment to separate the liquid and solid phases (T04). A maximum of 11,356 liters (3,000 gallons) of waste acid per day could be treated in the centrifuge. The solid waste from the centrifuge was collected in containers and transferred to the 303-K Storage Unit. The liquid effluent was pumped from the centrifuge to tank 5 and to a filter press for additional treatment to remove fine solids (T04), which remained following treatment in the centrifuge. The filter press treated a maximum of 4,542 liters (1,200 gallons) per day. Solids collected in the filter press were sent to the uranium recovery system or to the 303-K Storage Unit. The filtered liquid effluent was drained into effluent collection tanks (tanks 9 and 10), where the liquid effluent was stored temporarily before being pumped to the 311 Tank Farm.

Section III.C., Description of Process Codes (Cont.)

T01, S02 - The 311 Tank Farm was used for storage of treated liquid effluents from both the 300 WATS and the uranium recovery process. Storage occurred in two tanks (tanks 40 and 50) with capacities of 15,142 and 18,927 liters (4,000 and 5,000 gallons), respectively. Tanks 40 and 50 are constructed of stainless steel. Tank 50, the 18,927 liter (5,000 gallon) tank, occasionally was used for decanting waste when the centrifuge in the 313 Building was down for maintenance. Tank 50 was capable of treating up to 18,927 liters (5,000 gallons) per day, but only was used occasionally for decanting waste (a total of five times between January 1986 and December 1987).

Auxiliary equipment (two pumps, two cartridge filters, and two sample ports) are housed in the adjacent 303-F Building. Auxiliary equipment was used to filter solutions and to recirculate the solutions between various tanks and the 313 Building for reprocessing.

Continued from page 2.
NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

I.D. NUMBER (entered from page 1)

W A 7 8 9 0 0 0 8 9 6 7

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

LINE NO.	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	300 Area Waste Acid Treatment System							
2	D001	2,086,525	K	T01	S02	T04		Tank-Treatment/Tank-Storage/
3	D002							Treatment-Other (Phase Seperation)
4	WT02							
5	D004							
6	through							
7	D009							Included With Above
8	D007	907	K	T01				Treatment-Tank (chemical treatment)
9	311 Tanks							
10	WT02	2,086,525	K	T01	S02			Treatment-Tank/Storage-Tank
11	D002							
12	D004							
13	through							
14	D009							Included With Above
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

Continued from the front.

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM SECTION D(1) ON PAGE 3.

The 300 WATS was used to treat both mixed and dangerous waste from fuels fabrication operations in the 333 Building and from nonroutine waste additions. Treatment was performed to make the waste more amenable for further treatment and for storage. The 333 Building waste primarily consisted of hydrofluoric acid, nitric acid, sulfuric acid, and copper nitrate. These routine waste types exhibited the dangerous waste characteristics of ignitability (D001) and corrosivity (D002) as the nitric acid is considered an oxidizer in accordance with Washington Administrative Code 173-303. Routine waste also was considered a state-only, toxic, dangerous waste (WT02). Additionally, some of the routine waste was designated characteristic waste due to chromium (D007). Nonroutine waste added to the system included characteristic waste due to arsenic (D004), barium (D005), cadmium (D006), lead (D008), and mercury (D009). Approximately 2,086,525 kilograms (4,600,000 pounds) of waste were treated and stored yearly in this system. Approximately 907 kilograms (2,000 pounds) of waste (D007, chromium IV to chromium III) were treated per year.

The 311 tank system was used for the treatment and storage of waste. This waste was effluent from the waste acid treatment and uranium recovery process. This waste, depending on the variations in the treatment process, was considered mixed waste due to toxicity (WT02). Routine and nonroutine waste added to the waste acid treatment system included characteristic waste due to arsenic (D004), barium (D005), cadmium (D006), chromium (D007), lead (D008), and mercury (D009). The waste frequently had a pH greater than 12.5, which exhibits the dangerous waste characteristic of corrosivity (D002). Approximately 2,086,525 kilograms (4,600,000 pounds) of waste were treated and stored per year in the 311 tanks.

V. FACILITY DRAWING Refer to attached drawing(s).

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

VI. PHOTOGRAPHS Refer to attached photograph(s).

All existing facilities must include photographs *(aerial or ground-level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

VII. FACILITY GEOGRAPHIC LOCATION This information is provided on the attached drawing(s) and photograph(s).

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*

VIII. FACILITY OWNER

[X] A. If the facility owner is also the facility operator as listed in Section VII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME *(print or type)*	SIGNATURE	DATE SIGNED
John D. Wagoner, Manager U.S. Department of Energy Richland Operations Office	John D. Wagoner	9/26/96

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME *(print or type)*	SIGNATURE	DATE SIGNED
SEE ATTACHMENT		

CONTINUE ON PAGE 5

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

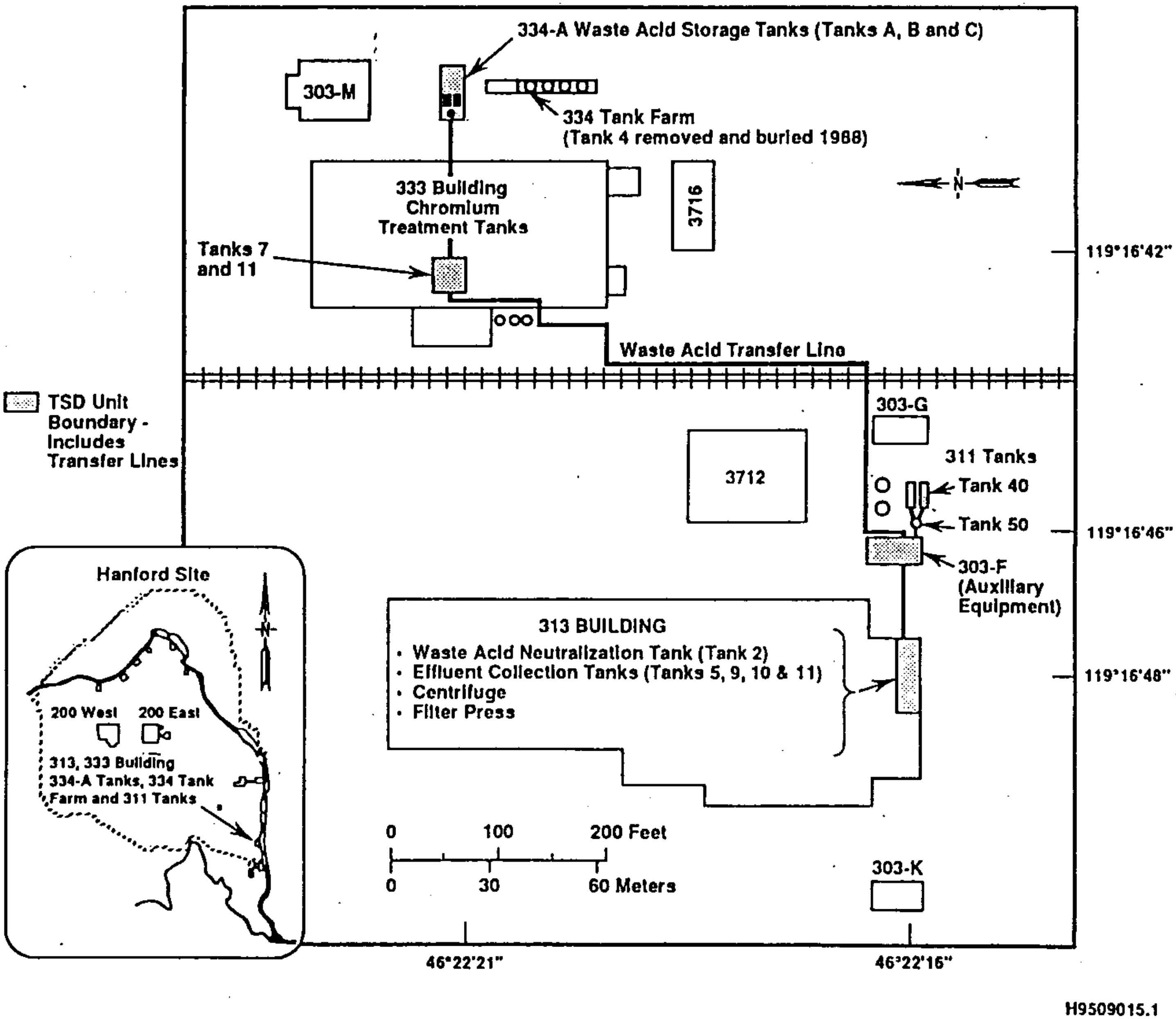
John D. Wagoner
Owner/Operator
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

9/26/96
Date

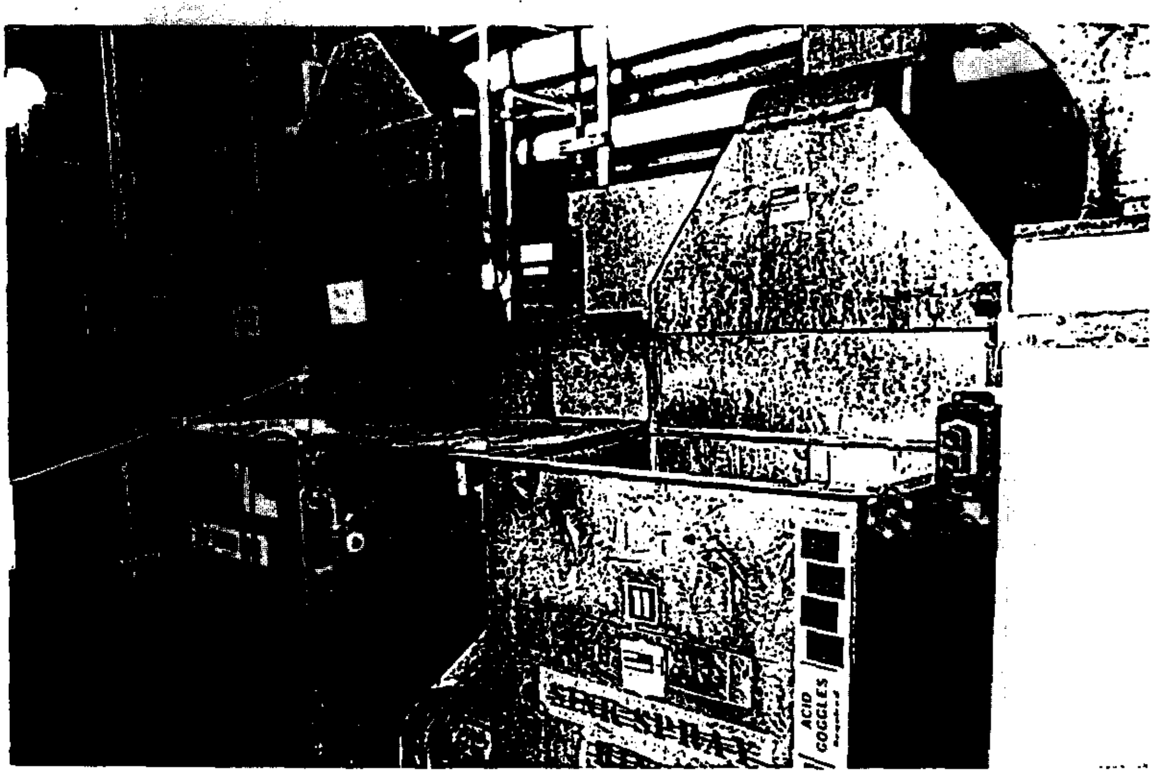
Co-operator
H. J. Hatch,
President and Chief Executive Officer
Fluor Daniel Hanford, Inc.

9/13/96
Date

300 Area Waste Acid Treatment System



300 AREA WASTE ACID TREATMENT SYSTEM--333 BUILDING

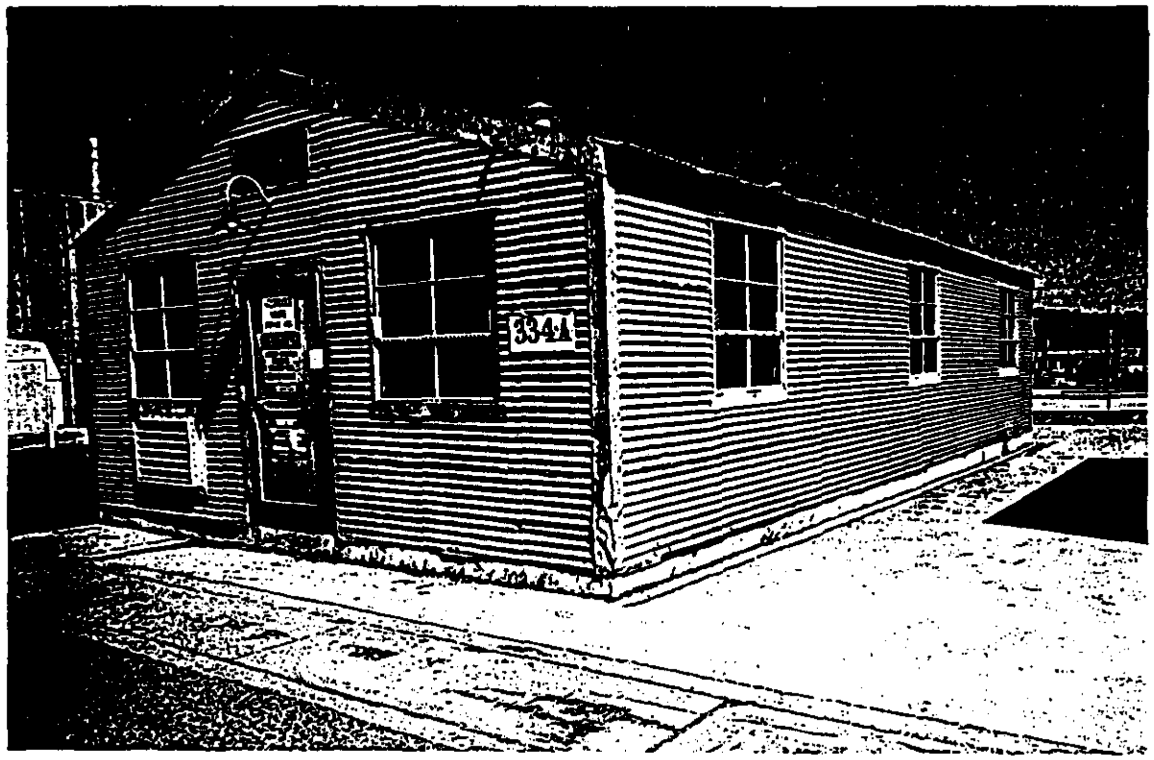


TANKS 7 AND 11--CHROMIUM (IV) REDUCTION

46°22'21"
119°16'42"

95080690-2CN
(PHOTO TANK 1987)

300 AREA WASTE ACID TREATMENT SYSTEM--334-A BUILDING



46°22'21"
119°16'42"

95080690-12CN
(PHOTO TANK 1995)

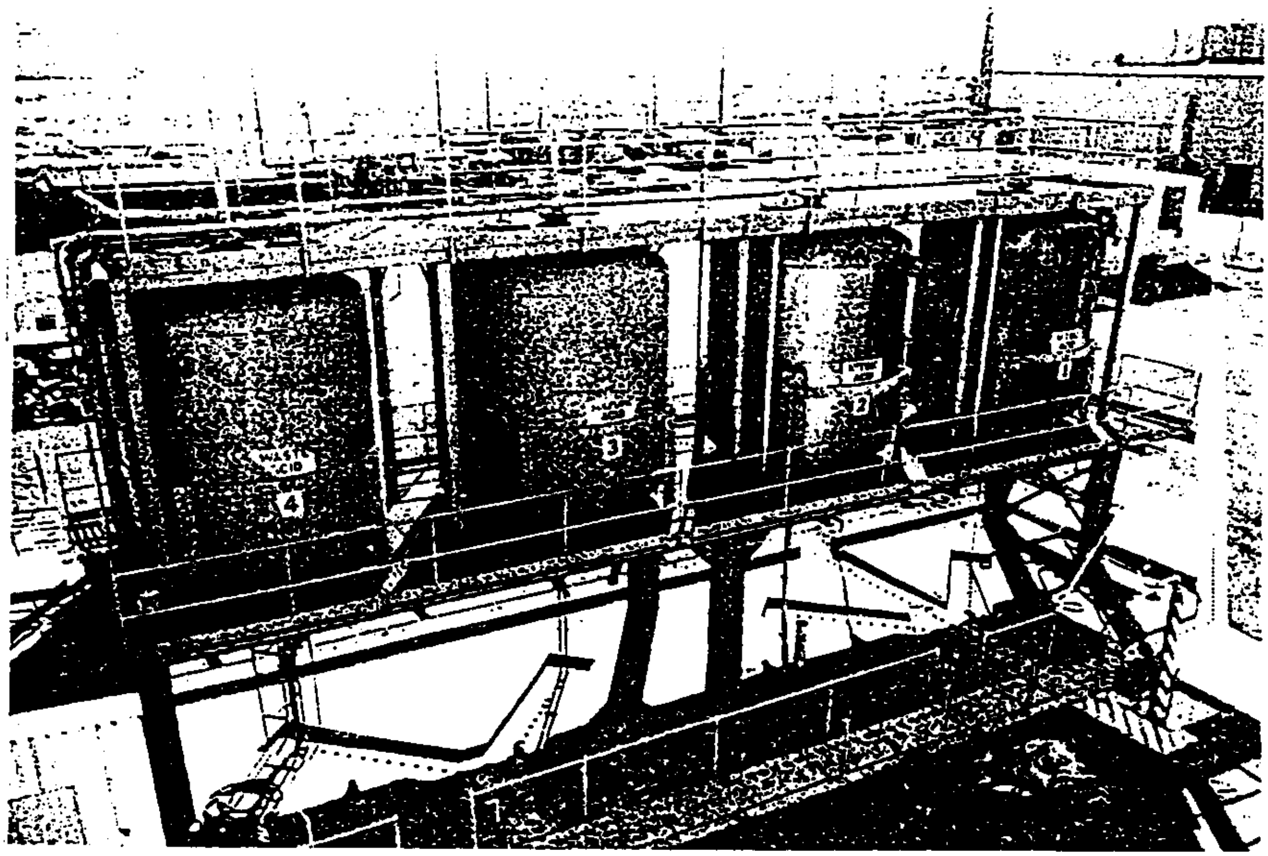
300 AREA WASTE ACID TREATMENT SYSTEM--334-A WASTE ACID STORAGE TANKS

TANKS A, B, AND C
(TANK A TAKEN OUT OF SERVICE IN 1988)

46°22'21"
119°16'42"

95080690-22CN
(PHOTO TANK 1995)

300 AREA WASTE ACID TREATMENT SYSTEM--334 TANK FARM

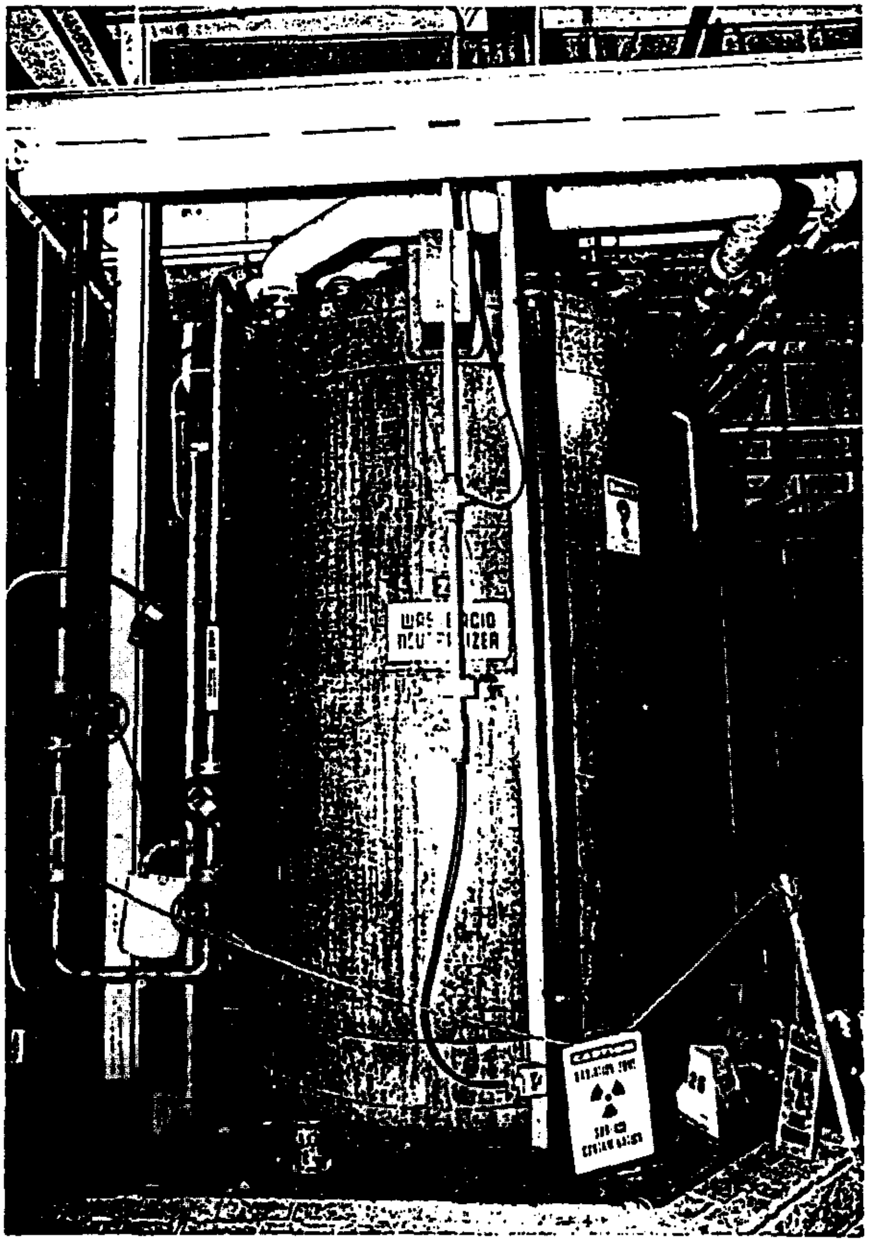


WASTE ACID TANK 4 (REMOVED, CLEANED, AND BURIED IN 1988)

46°22'21"
119°16'42"

8306387-6CN
(PHOTO TANK 1983)

300 AREA WASTE ACID TREATMENT SYSTEM--313 BUILDING WASTE ACID NEUTRALIZATION TANK

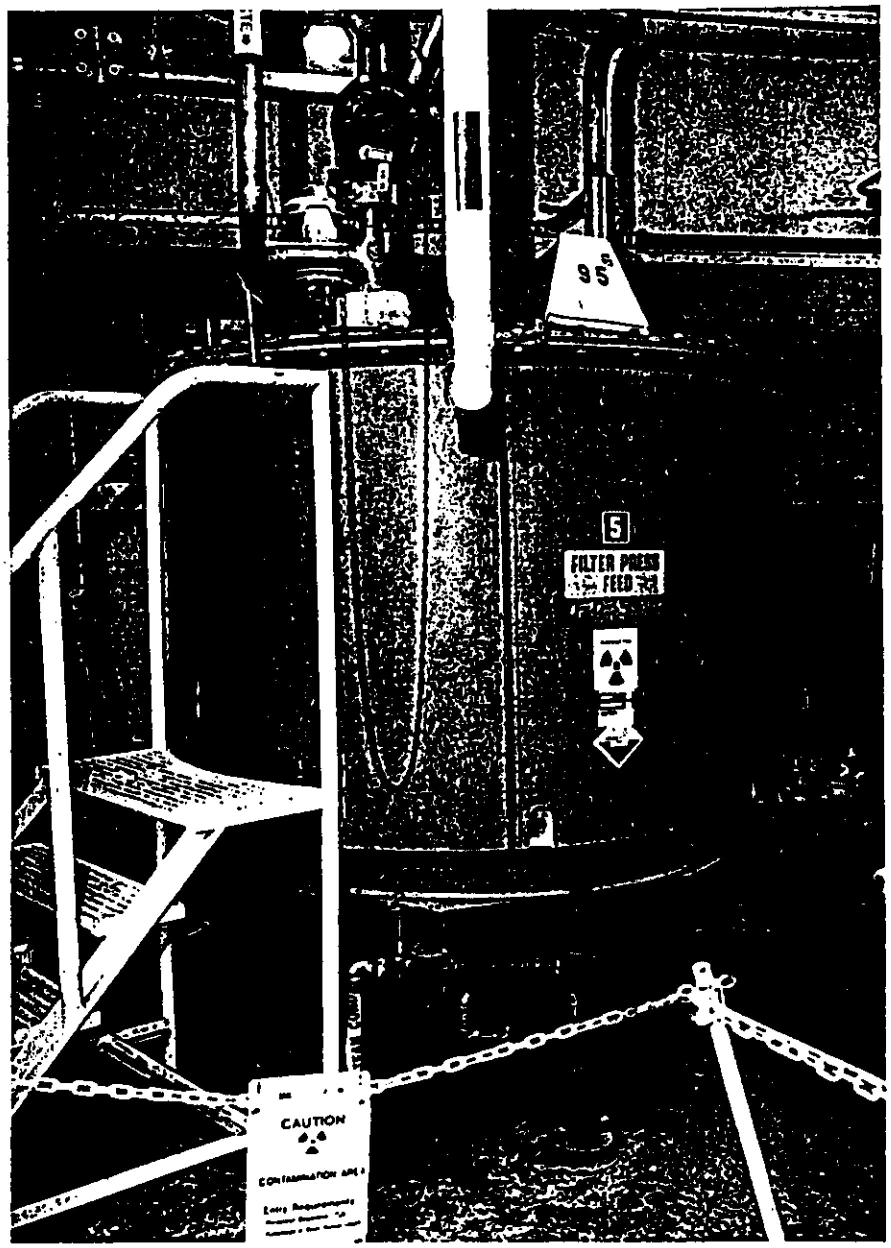


TANK 2

46°22'16"
119°16'48"

8704479-6CN
(PHOTO TAKEN 1987)

300 AREA WASTE ACID TREATMENT SYSTEM--
313 BUILDING

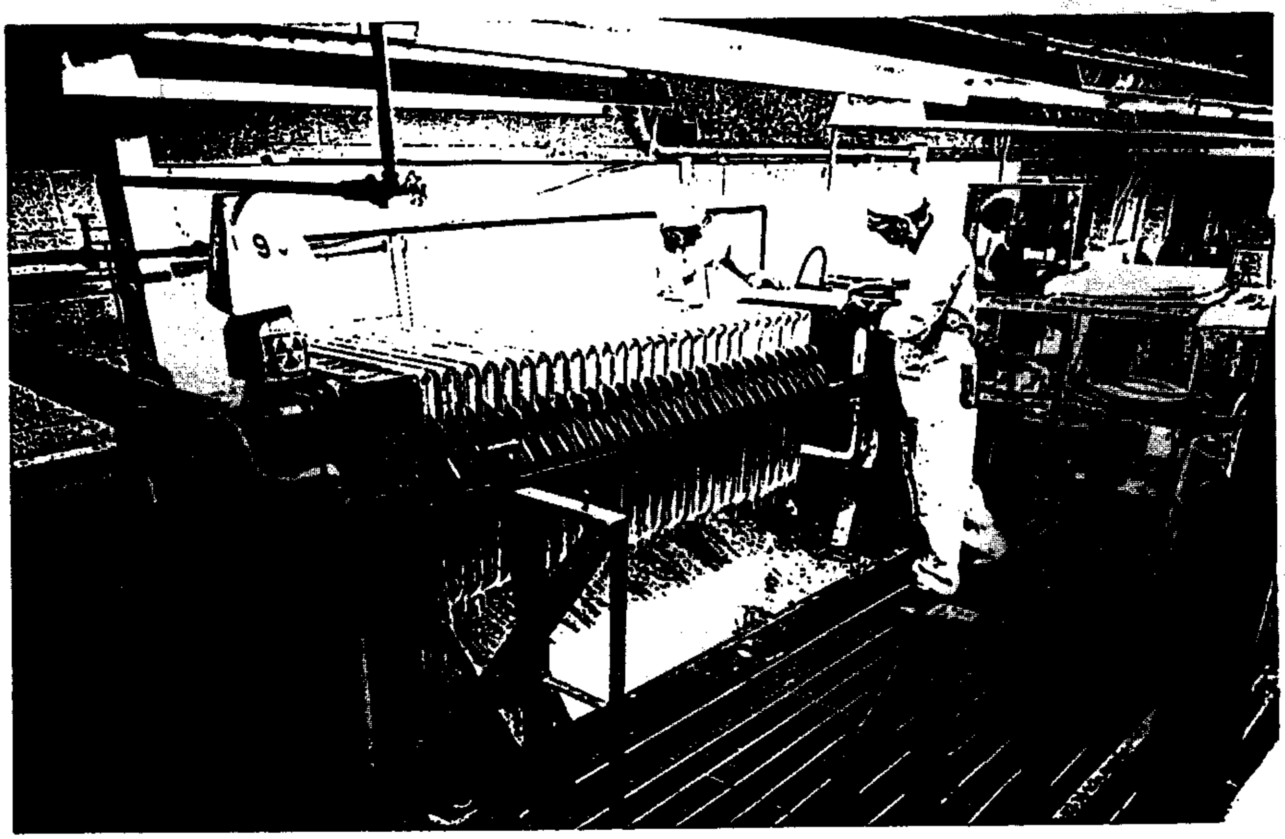


TANK 5

46°22'16"
119°16'48"

95080690-26CN
(PHOTO TAKEN 1987)

300 AREA WASTE ACID TREATMENT SYSTEM--313 BUILDING

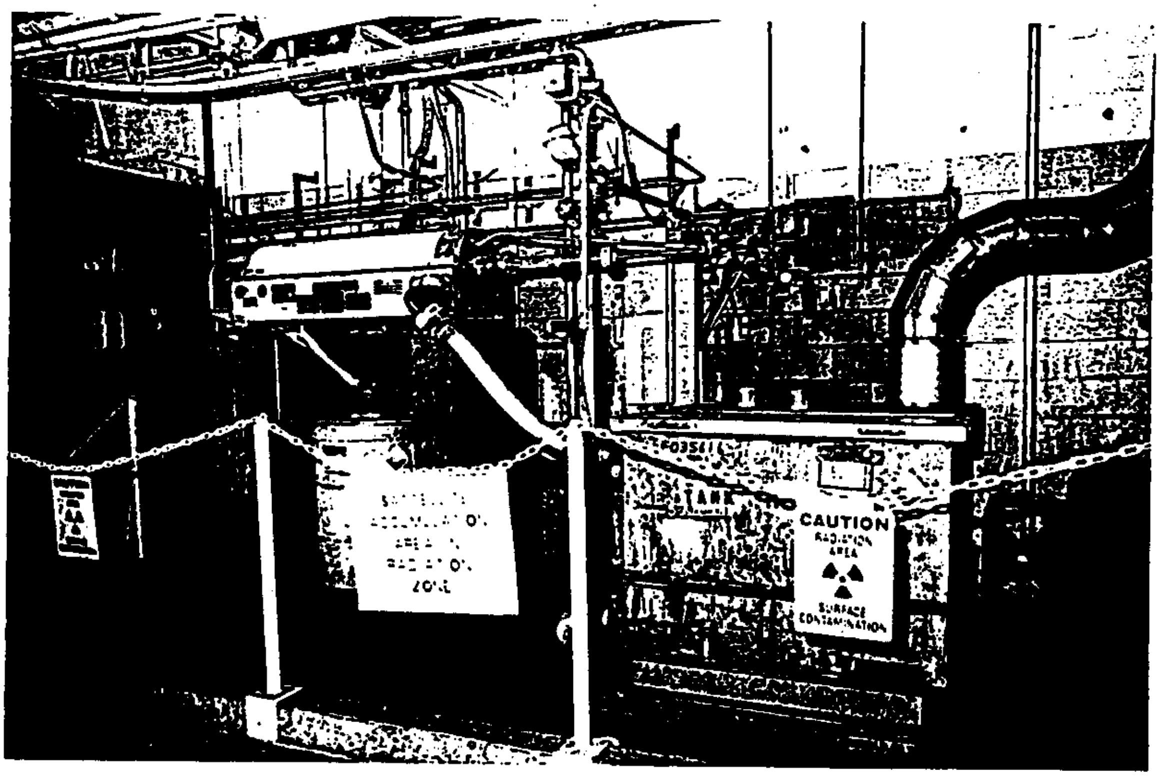


FILTER PRESS

46°22'16"
119°16'48"

7510170-19CN
(PHOTO TANK 1975)

300 AREA WASTE ACID TREATMENT SYSTEM--313 BUILDING

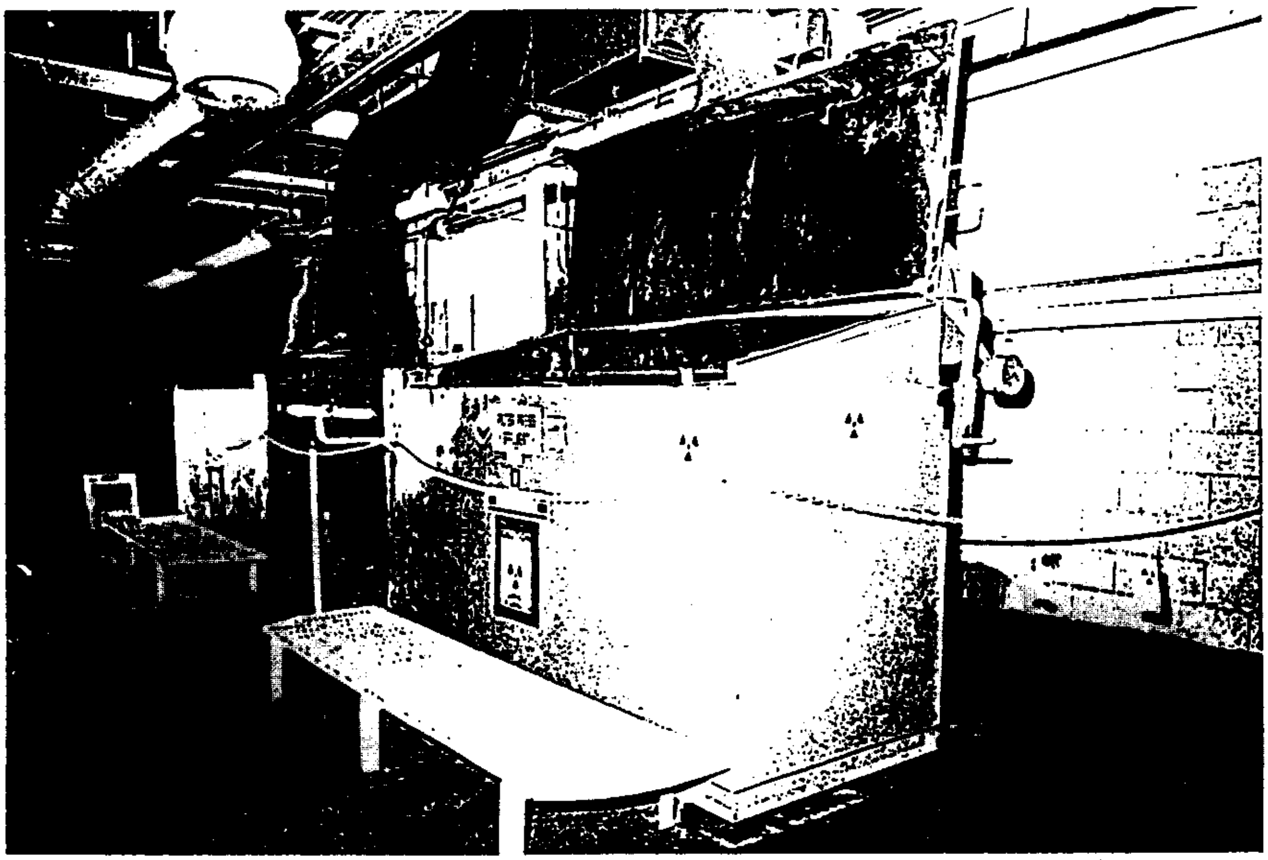


CENTRIFUGE WITH LIQUID RECEIVING TANK 11

46°22'16"
119°16'48"

90022759- 5CN
(PHOTO TANK 1989)

300 AREA WASTE ACID TREATMENT SYSTEM--313 BUILDING

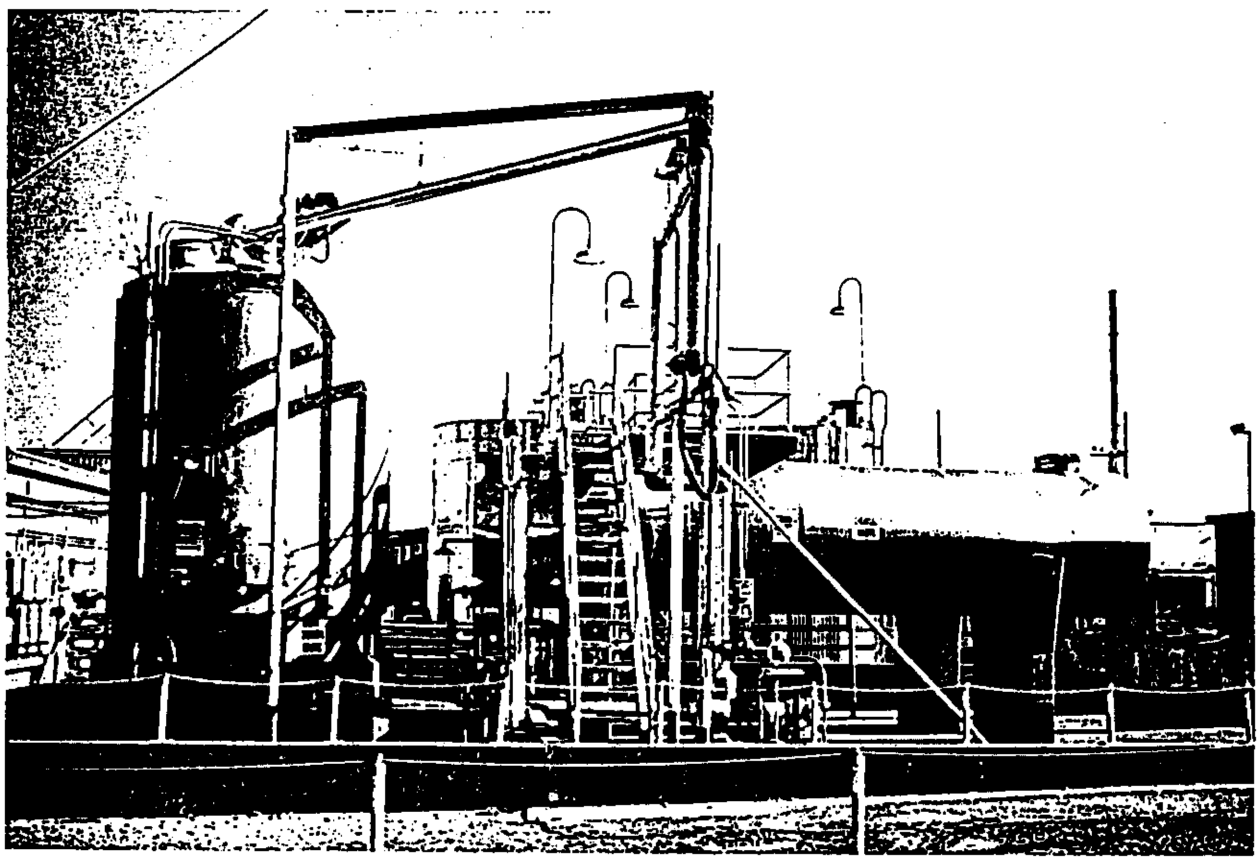


TANKS 9 AND 10--EFFLUENT COLLECTION TANKS

46°22'16"
119°16'48"

9022759-7CN
(PHOTO TANK 1990)

300 AREA WASTE ACID TREATMENT SYSTEM--311 TANK FARM

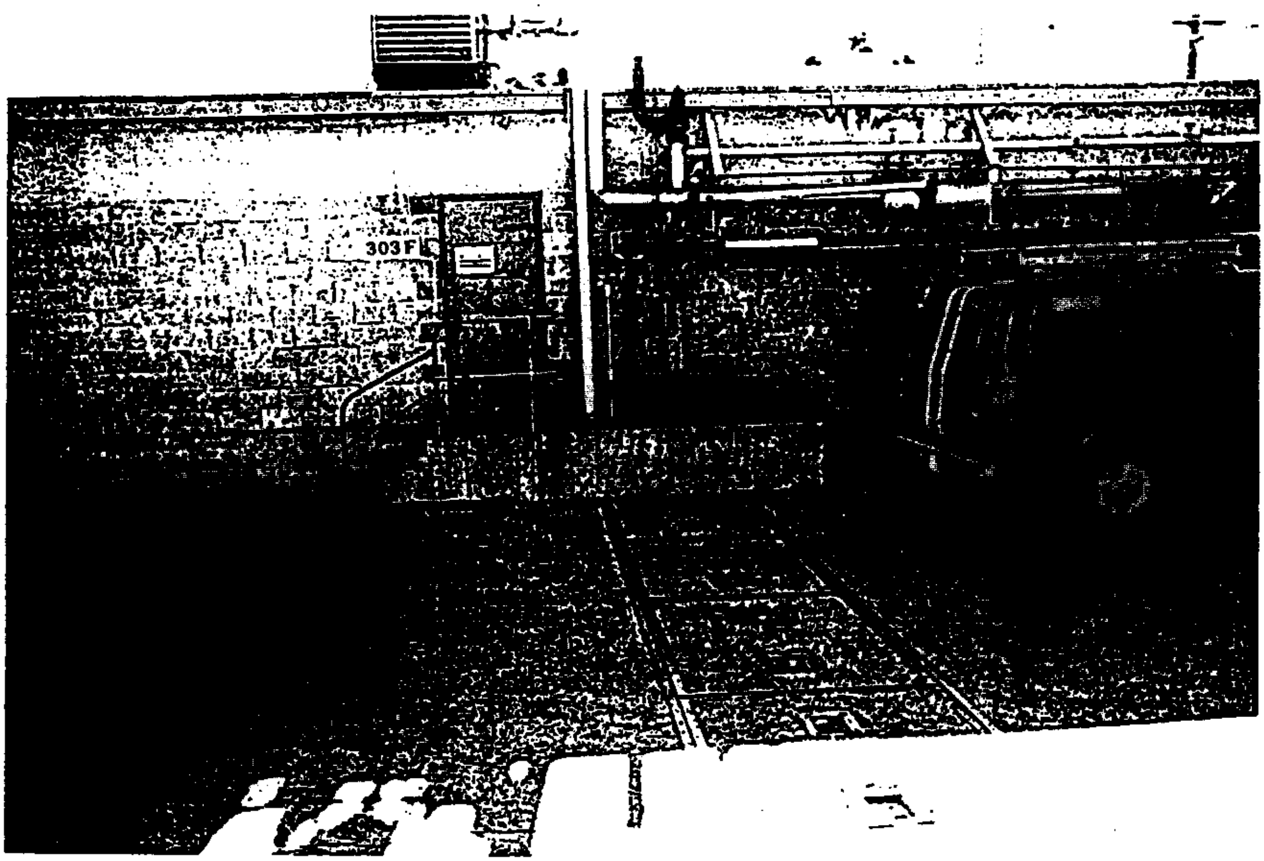


TANKS 40 AND 50

46°22'16"
119°16'46"

85050353-9CN
(PHOTO TANK 1985)

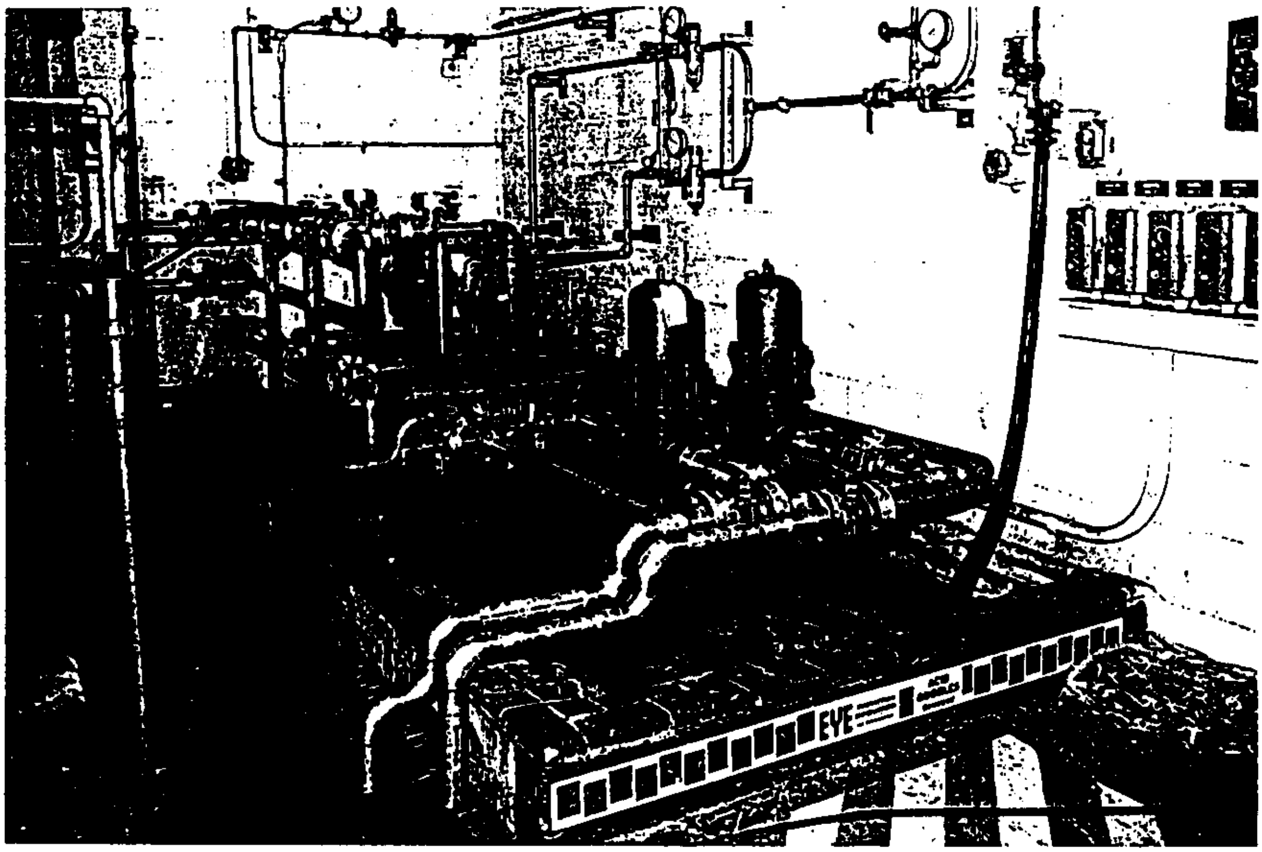
300 AREA WASTE ACID TREATMENT SYSTEM--303-F BUILDING



46°22'16"
119°16'46"

89050353-8CN
(PHOTO TANK 1989)

300 AREA WASTE ACID TREATMENT SYSTEM--303-F BUILDING



AUXILIARY EQUIPMENT (PUMPS, FILTERS, AND SAMPLE PORTS)

46°22'16"
119°16'46"

89050353-7CN
(PHOTO TANK 1989)

CONTENTS

300 AREA WASTE ACID TREATMENT SYSTEM CLOSURE PLAN

1.0 INTRODUCTION

The 300 Area Waste Acid Treatment System (WATS) is a tank system that was used to treat and store nonrecoverable uranium-bearing waste acid from reactor fuel fabrication operations. Waste acid neutralization occurred in portions of what now is the 300 Area WATS before operation of the system as a *Resource Conservation and Recovery Act* (RCRA) *of 1976* unit. This closure plan details closure of RCRA components and areas, and of contamination resulting from RCRA operations. This unit consists of portions of four buildings and two tank farms: 334-A Building, 313 Building, 303-F Building, 333 Building, and 334 and 311 Tank Farms.

300 Area WATS is proposed to undergo clean or modified closure to the performance standards of *Dangerous Waste Regulations,* Washington Administrative Code (WAC) 173-303-610 and WAC 173-303-640 with respect to all dangerous waste, materials, and media (i.e., soil) contaminated from operation of the 300 Area WATS as a RCRA unit. The closure process for 300 Area WATS is divided into two primary steps that will occur over an extended closure period. The first step is partial clean closure that occurs under this closure plan. This will be achieved by clean closing aboveground structures and components and soils not impacted by 300 Area WATS operations. The activities for partial clean closure activities currently are ongoing using a three-phased approach. After partial clean closure, the unit will be transitioned to Hanford's Environmental Restoration Contractor (ERC) to disposition soil identified in this closure plan as impacted by 300 Area WATS operations and to coordinate final 300 Area WATS closure. Soil disposition will be performed at a later date under other documents in conjunction with the future 300-FF-2 *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) *of 1980* operable unit (OU) remedial action. The results of final closure activities will be documented in a later revision to this plan.

The 300 Area Process Sewer (PS) and the WATS and U-Bearing Piping Trench will be investigated by the CERCLA remedial investigation/feasibility study (RI/FS) process for the 300-FF-2 OU outside the scope of 300 Area WATS closure. Potential contamination at 300 Area WATS locations, identified by the closure process as predating RCRA operations or originating from non-RCRA systems or components, will be addressed outside the scope of 300 Area WATS closure.

Some 300 Area WATS tanks and structures will remain after closure. The Declaration of the Record of Decision (ROD) (DOE et al., 1996) for the 300-FF-1 and 300-FF-5 OUs reflects industrial usage of the 300 Area for the foreseeable future. It is likely that the 300-FF-2 ROD will retain the industrial usage scenario and there could be a future use for such tanks and structures after clean closure. If no future use is identified for these materials, the materials could be disposed as a portion of decontamination and decommissioning (D&D) activities.

300 Area WATS is within the 300-FF-2 (source) and 300-FF-5 (groundwater) OUs, as designated in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1999). 300-FF-2 and 300-FF-5 OUs are scheduled to be remediated using the CERCLA RI/FS process. Any remediation of groundwater contamination within these OUs, although not expected as a result of 300 Area WATS RCRA operations, would occur under the 300-FF-5 OU RI/FS processes.

CONTENTS

FIGURES

2.0 FACILITY DESCRIPTION

The 300 Area WATS is located in the 300 Area (Figure 2-1) of the Hanford Site and operated as a tank system for treatment and storage of waste acid. The 300 Area WATS consisted of tanks, ancillary equipment, and secondary containment structures located in portions of the 334-A Building, 303-F Building, 333 Building, 313 Building, and the 311 and 334 Tank Farms. Transfer piping between the buildings is contained in a covered concrete pipe trench identified as the WATS and U-Bearing Piping Trench. Figure 2-2 shows the location of the buildings and trenches. Each area and its components are further identified in Figures 2-3 through 2-10.

300 Area WATS closure activities began in 1996. Although 300 Area WATS remains unclosed, most 300 Area WATS tanks and equipment have been removed. The following description is before commencing closure activities.

2.1 GENERAL DESCRIPTION AND OPERATIONS

Waste acids treated in the 300 Area WATS were generated during fuel fabrication operations in the 333 Building. Fuel fabrication process tanks 7 and 11, which are located in the 333 Building, also were used to treat the waste acid by reducing chromium from Cr^{+6} to Cr^{+3}. From the 333 Building, waste acids were piped to the 334-A Building for temporary storage in tanks A, B, C, or tank 4 of the 334 Tank Farm. Tank 4 was removed and disposed in the Low-Level Burial Grounds (LLBG). The acids were piped to the south room of the 313 Building, which was called the uranium recovery area, for neutralization. Before 1985, the neutralized acid slurry was stored in tank 40 of the 311 Tank Farm until transferred by tanker truck to the 183-H Solar Evaporation Basins. After 1985, the slurry underwent solids separation at the 313 Building through the combined use of a centrifuge and a filter press. Solids from the centrifuge were drummed for transport to the 303-K Storage Unit or the LLBG for disposal. Solids from the filter press were not considered waste and were drummed for offsite uranium recovery. The 313 Building effluents were pumped for storage to tanks 40 and 50 in the 311 Tank Farm. Effluent was circulated between the tanks and sometimes back to the 313 Building by pumps located in the 303-F Building. The effluent exited the system by being offloaded into tanker trucks for long-term storage in the Double-Shell Tank (DST) System.

2.1.1 Waste Transfer Piping and the WATS and U-Bearing Piping Trench

The waste acid transfer lines between the 333, the 334-A, and the 313 Buildings are of polyvinyl chloride (PVC) construction. The treated effluent transfer lines between the 313 Building and the 311 Tank Farm are stainless steel. These lines are contained in the WATS and U-Bearing Piping Trench, a contiguous, belowgrade concrete structure connecting various 300 Area WATS buildings and structures. This trench has concrete cover blocks or metal cover plates and totals about 195 meters in length. The portion of the trench between the 333 Building and the 303-F Pumphouse was constructed with 3.8 centimeter weepholes, spaced approximately every 6 meters, along the bottom to allow precipitation to drain to soil. The TSD unit boundary includes the transfer lines but not the trench structure. This trench was constructed in the early 1960s and predates 300 Area WATS operations. The trench houses other piping systems, including Uranium-Bearing System piping that, for many years before WATS operations, transported similar waste that contaminated the trench with similar waste constituents.

2.1.2 333 Building Description

The 300 Area WATS components of the 333 Building are tanks 7 and 11 (Figure 2-3), and the 2-inch PVC drain piping from these tanks and from non-WATS tanks that also drained waste acid to the 334-A Building storage tanks. The location of waste transfer piping within the building is identified in Figure 2-4. Tanks 7 and 11 are square, uncovered metal tanks used for chrome reduction treatment.

Sawcuts exist in the floor near tanks 7 and 11 that are smooth and narrow (approximately 0.64 centimeter wide) (Figure 2-3). The sawcuts are filled with an unidentified crack sealant material. The limited potential for these cracks to have received RCRA spills is discussed in Chapter 3.0, Section 3.2.1. The origin and depth of the sawcuts are unknown.

2.1.3 334-A Building Description

300 Area WATS areas and components of the 334-A Building are identified in Figure 2-5. The building shell was moved to this location and renovated in 1974 into the present 334-A Building. The dimensions of the 334-A Building are 11.77 meters by 5.58 meters. The abovegrade area of the building is used only for general storage of nonhazardous products. The belowgrade area (tank pit) housed piping and components to transfer and store waste acid.

The tank pit contains three tanks: tanks A, B, and C. Tank A is a vertical tank with a capacity of 1,135 liters. In 1988, the tank was cleaned and removed from service. Discussions with 300 Area personnel involved with this activity indicated that after tank A was removed from service, the associated pump, piping, and the tank PVC liner were flushed, removed, and containerized in a burial box for transfer to LLBG. Records of the cleanout and disposal activity have not been located. Tank A was cleaned and the plastic liner was removed when the tank was taken out of service in 1988; no visible regulated waste or waste residues from operations existed in this tank. However, the tank had been opened and contained minor amounts of nonregulated debris (dirt) that fell into the tank from the grating above.

Tanks B and C, which have a capacity of 7,570 liters each, are horizontal cylindrical tanks of high-density polyethylene construction supported belowgrade by stainless-steel saddles. These tanks are 3.54 meters long and 1.77 meters in diameter (outside dimensions) and sit approximately 51 centimeters above the floor. Tank wall thicknesses are unknown, but are highly variable as a result of the molded plastic construction. A maintenance hole with a stainless-steel cover is located on the top of each tank above the normal acid levels. Electrode-type high-level alarms and float- and cable-level indicator systems remain in the tanks. As dangerous waste tanks, inspections of each tank, adjacent piping, and surrounding areas were performed weekly to check for damage, deterioration, or leakage. The completed inspection forms are filed in the 333 Building.

The tank pit is a 5.7-meter-long, by 5.58-meter-wide, by 3-meter-deep that serves as a containment basin in the event of tank or piping failure. The pit is covered by a metal grate. The floor grating directly above the tank pit and the 334-A Building above the grating were never 300 Area WATS operational areas and are outside the scope of 300 Area WATS closure. The pit is constructed of reinforced concrete with a glass-filled polyester acid-resistant coating on the floor and lower 61 centimeters of the walls. The tank pit originally was coated with Carboglas[1] 1601 SG. In 1987, the floor and bottom 53 centimeters of the walls were overcoated with Semstone[2] 884, an impermeable acid-resistant coating.

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[1] Carboglas is a trademark of the Carboline Company.

[2] Semstone is a trademark of Century Polymer Company.

Where the new coating was placed, the old coating was removed completely and the floor and portions of the walls were decontaminated aggressively by sandblasting. Some of the original coating extends approximately 7.6 to 10.1 centimeters above the new coating on the wall to a height of approximately 61 centimeters from the floor. Currently, a coating of 5-centimeter styrofoam insulation, overlaid with 2-centimeter cement slurry and wire mesh, begins 2.5 centimeters from the pit floor and rises to the bottom of the grate covering.

The floor drain to the PS was fitted with a removable PVC plug in 1986 to prevent the entry of acids into the sewer in the event of a spill. Before the use of the PVC plug, a 61-centimeter-high PVC standpipe was installed in the floor drain.

A plastic pump (since removed) located in the 334-A Building pit transferred the waste acid through a 294-meter-long, 2-inch-diameter pipe from the 334-A Building tanks to tank 2 in the 313 Building for neutralization.

2.1.4 334 Tank Farm Description

The 300 Area WATS portions of the 334 Tank Farm are the uncoated concrete pad and drainage trench (identified in Figure 2-6) and the tank support structure. The pad is located directly below where 300 Area WATS tank 4 and three other similar, non-300 Area WATS tanks were supported by a large steel structure. No cracks exist in the concrete pad. Tank 4 was a lined carbon steel tank that usually was empty but was kept available as an overflow tank for the tanks in the 334-A Building. In 1986, tank 4 failed near the top, above the liner. In 1988, tank 4 was removed, cleaned, and disposed in the LLBG. The paint on the tank support structure predates this spill. Portions of the painted surface exhibit rust. No 300 Area WATS piping remains at this location.

2.1.5 313 Building Description

The 300 Area WATS portions of the 313 Building were contained in one room (Figure 2-7), called the uranium recovery area. The 313 Building was constructed on a concrete slab. Currently, all tanks in this room are surrounded by 22-centimeter-high berms installed to contain spills. The berms (Figure 2-5) divide the room into four separate bermed areas.

2.1.5.1 Bermed Areas

The oldest bermed area is located in the northwest corner of the room and dates from 1953. This area contains 300 Area WATS tanks 2 and 5. The berm and the concrete floor are covered with acid split brick. Acid split brick is half brick with a glazed coating that was intended to be impervious to spilled acid. The acid brick originally was painted yellow with Amercoat[1]. A drainage trench running east-west the length of this area contains a sump that, until 1987, allowed spills to drain to the PS. The drainage trench is covered with removable cast-iron alloy metal grates. The trench originally was covered with acid brick, but now is lined with a stainless steel catch pan that was installed before RCRA operations in the early 1970's during floor repairs (BHI 1993). In 1987, the sump was backfilled with concrete, and the drain to the PS was plugged.

The second bermed area was created in 1983 when a berm was built around the filter press. The floor in this area is not covered with acid brick and currently is covered with an unidentified, blue-colored

[1] Amercoat is a trademark of American Paint Corporation.

coating. The berm is coated with acid-resistant epoxy paint. Condensate drain piping from equipment in bermed areas 1 and 2 is routed to a protruding floor drain. The floor drain discharges to a sump located in an unbermed, open area of the floor at the east end of the room.

The third bermed area was created in 1985 when a berm was built around the newly installed centrifuge. The berm and floor are coated with an epoxy floor covering. The sump in this area originally drained to the PS and is covered with a cast iron grate. In 1987, the sump was backfilled with concrete and the drain to the PS was plugged.

The fourth bermed area was created in 1987 when berms were built around tanks 9 and 10 and an east-west running trench. A contiguous area of the floor beneath tanks 9 and 10, and the drainage trench in this area, were covered with acid split brick in 1953. This area was sandblasted before constructing the berm and recoating the floor with Semstone. The trench contains a sump that was backfilled with concrete in 1987, plugging the drain to the PS. As discussed in Chapter 3.0, soil beneath this portion of the floor could be contaminated from defective drains. The trench was covered with removable cast-iron alloy metal grates and lined with a stainless steel catch pan similar to the liner installed in the early 1970's in bermed area 1. The floor around the tanks was sloped to drain to the trench.

A sump exists at the east end of the room, which originally drained to the PS and is not in one of the bermed areas. This sump also was backfilled with concrete, and the drain lines to the PS plugged in 1987. The sump appears to be bare concrete covered with a cast iron metal grate.

2.1.5.2 313 Building Components and Piping

Tank 2 is a vertical, cylindrical tank with a nominal capacity of 5,678 liters and a small top inspection plate. An external water jacket surrounds 80 percent of the sidewall and provided cooling of the neutralization reaction. The tank is constructed of Type 347 stainless steel with 1.3-centimeter-thick bottom and sidewalls. The tank is equipped with a float-and-cable level indicator with a high-level alarm and pump cut off. An encapsulated tilt switch, which is suspended in the top of the tank, provided an alarm to indicate overfilling of the tank. The tank is 271.8 centimeters in height and 172.7 centimeters in diameter.

Pump P2 was used as a recirculation pump during neutralization in tank 2. From January 1975 to November 1985, pump P2 transferred neutralized slurry from tank 2 through a 2-inch-diameter stainless steel line to tank 40 in the 311 Tank Farm. After that time, pump P2 pumped tank 2 waste to a metal centrifuge, installed in November 1985, to separate liquids and solids. A maximum of 11,356 liters of waste could be treated per day, but generally operated at a rate much less than maximum capacity.

Tank 11, installed in 1985, is a square 984-liter tank with a flat, sloped bottom and a loose lid. The tank was used as an effluent receiving tank for the centrifuge. The tank has a shell that is constructed of 304-L stainless steel (designed to provide support only and not intended as a liquid barrier) and is lined with 0.64 centimeter of PVC. A high-level and low-level electrode-type level control provided control of transfer pump P9, which transferred effluent from tank 11 to tank 5 or tanks 40 and 50 in the 311 Tank Farm. Inside, the tank is 122 centimeters long, 122 centimeters wide, and 94 centimeters high.

Tank 5, the filter press feed tank, is a 2,498-liter, vertical, cylindrical tank with a flat, sloping bottom and a vented flat lid. Construction is listed as 18-8 Cb-type stainless steel with a wall and base thickness of 0.64 centimeter. An external steam coil and sidewall insulation also are present. The tank is equipped with a tilt-switch, high-level sensor. The tank is 1.6 meters in diameter, 1.4 meters high, and 5.1 meters in circumference.

Pump 7 was used to force the slurry through the plate-and-frame filter press. The filter press frame is constructed of cast iron. The plates were cast iron until the early 1980's, when the plates were replaced with polypropylene plates. The press could treat a maximum of 4,542 liters per day.

Tanks 9 and 10 are rectangular 2,119-liter tanks with hinged covers. These tanks did not enter operations as 300 Area WATS components until 1985, and were used primarily for emergency storage of clarified, room temperature filter press effluent before transfer to chemical waste storage tanks. The wetted portions are constructed of 0.51-centimeter-thick monel, with a metal skin that protects the exterior insulation on the sidewalls and bottoms. Overfill alarm tilt switches are suspended near the top of the tanks. An air diaphragm pump (P8) transferred liquid from tanks 9 or 10 to any of several locations within the 313 Building, including tank 5 and to tanks 40 and 50 in the 311 Tank Farm. The tanks are 2.5 meters long, 1 meter wide, and 1.25 meters high.

Before use as 300 Area WATS effluent tanks (1953 to 1971), tanks 9 and 10 contained a boiling caustic bath for stripping aluminum cladding from fuel assemblies. The ventilation hoods above tanks 9 and 10 were connected to a roof fan that removed chemical fumes from the room. The ventilation hoods have not been used for 300 Area WATS operations because tanks 9 and 10 did not produce chemical fumes.

2.1.6 303-F Building Description

The 300 Area WATS portions of the 303-F Building are identified in Figure 2-8. The 303-F Building is 14 meters long, 7.6 meters wide, and 3 meters high. The building has a concrete floor with acid split brick in several areas and 30-centimeter-thick concrete block walls. Doors are on the north, west, and south sides.

The 300 Area WATS activities began in this building in November 1985 when two pumps, two cartridge filters, two sample ports, and the piping (Figure 2-9) were installed in the 303-F Building pumphouse to serve new tank 50 and existing tank 40. The pumps recirculated and filtered solutions in tanks 40 and 50 or transferred solutions between tanks 40 and 50 or back to tank 5 in the 313 Building for further treatment. These components are located above a pre-existing, concrete catch basin with two adjacent, stainless steel catch pans to contain spills (if any). The tops of the catch basin walls are lined with acid brick.

2.1.7 311 Tank Farm Description

The 300 Area WATS portions of the 311 Tank Farm are identified in Figure 2-10. These areas are located inside two separate concrete containment catch basins. The tank 50 basin was constructed in 1986, and tank 40 basin was constructed before RCRA operations. Both basins drained to the PS.

Tank 40 was installed in 1953 and was used for storage of product nitric acid until 1973, when the tank was converted to neutralized waste storage. Tank 40 is a horizontal, cylindrical, stainless steel tank with a 15,141-liter capacity that is supported by two concrete saddles. The tank has a diameter of 1.8 meters and a length of 7.25 meters. Construction is of 304-L stainless steel with 0.64-centimeter-thick walls and 0.84-centimeter-thick heads. Two maintenance holes are provided at the top of the tank. The tank had external electric heat and full insulation for freeze protection. The tank had an air supply for agitation if needed. A float-type level indicator installed in one maintenance hole operated an overfill alarm. The support pad for tank 40 is surrounded by a 60-centimeter-high concrete berm to contain any spillage. The floor of the tank 40 catch basin was sandblasted and resurfaced with an acid-resistant, epoxy coating in 1988. A low-point drain exists at the northwest corner of this basin where the north basin wall meets the basin floor. The drain assembly consists of approximately 10 feet of small bore, stainless steel piping with a manually operated valve at the end. This drain piping was removed and replaced in 1996 after 300 Area WATS operations ceased. The original valve was reused. Since operations ceased in 1995, the coating at basin lowpoints visibly has deteriorated.

Tank 50 was installed in November 1982 in a new concrete catch basin with an acid resistant coating. The original basin coating remains intact. Tank 50 is a vertical, cylindrical, 304-L stainless-steel tank with a capacity of 18,927 liters. The wall and head thickness of the tank is 0.64 centimeter. The tank diameter is 2.87 meters, and the height is 4 meters. The tank had external electrical heat and full insulation for freeze protection. Two maintenance holes are provided, one on top and one in the lower south side. The tank is equipped with a slow-speed mechanical agitator and an ultrasonic indicator that acted as an overfill alarm. A low-point floor drain exists at the northeast corner of the tank 50 basin. The drain discharges to the 300 Area PS via the WATS and U-Bearing Piping Trench located beside the basin. The drain is connected to a pipe stub with a manually operated valve located just outside the basin wall. During operations, this valve remained closed except during draining. This valve is now kept open.

Solutions from tanks 40 and 50 were pumped via transfer pump P10 into a tank trailer and transported to the 340-B Building for transfer by railcar to the DST System, or were transported offsite for disposal.

The 311 Tank Farm currently contains a 15,141-liter tank used to store product nitric acid that was removed from service before RCRA operations, and two 37,854-liter tanks used to store sodium hydroxide (tanks 1 and 2). All of these tanks were process chemical (product) tanks that did not manage RCRA waste and are not a portion of the 300 Area WATS closure.

2.2 SECURITY INFORMATION

Security information for the Hanford Facility is discussed in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28).

All persons entering the 300 Area must display a DOE-issued security identification badge indicating appropriate authorization. Personnel are subject to random searches of items carried into and out of the 300 Area. Signs posted at the 300 Area boundaries inside the Hanford Site state:

> NO TRESPASSING. SECURITY BADGES REQUIRED BEYOND THIS POINT.
> GOVERNMENT VEHICLES ONLY. PUBLIC ACCESS PROHIBITED.

or an equivalent legend.

To preclude unknowing access into the unit by unauthorized individuals, the 334-A Building, 313 Building, and the 303-F Building are kept padlocked. These buildings also are posted to allow entry by authorized personnel only and to identify hazards presented by the facilities. The 300 Area WATS area of the 333 Building, and the 334 and 311 Tank Farms that are outdoors, are roped off and posted to allow authorized entry only.

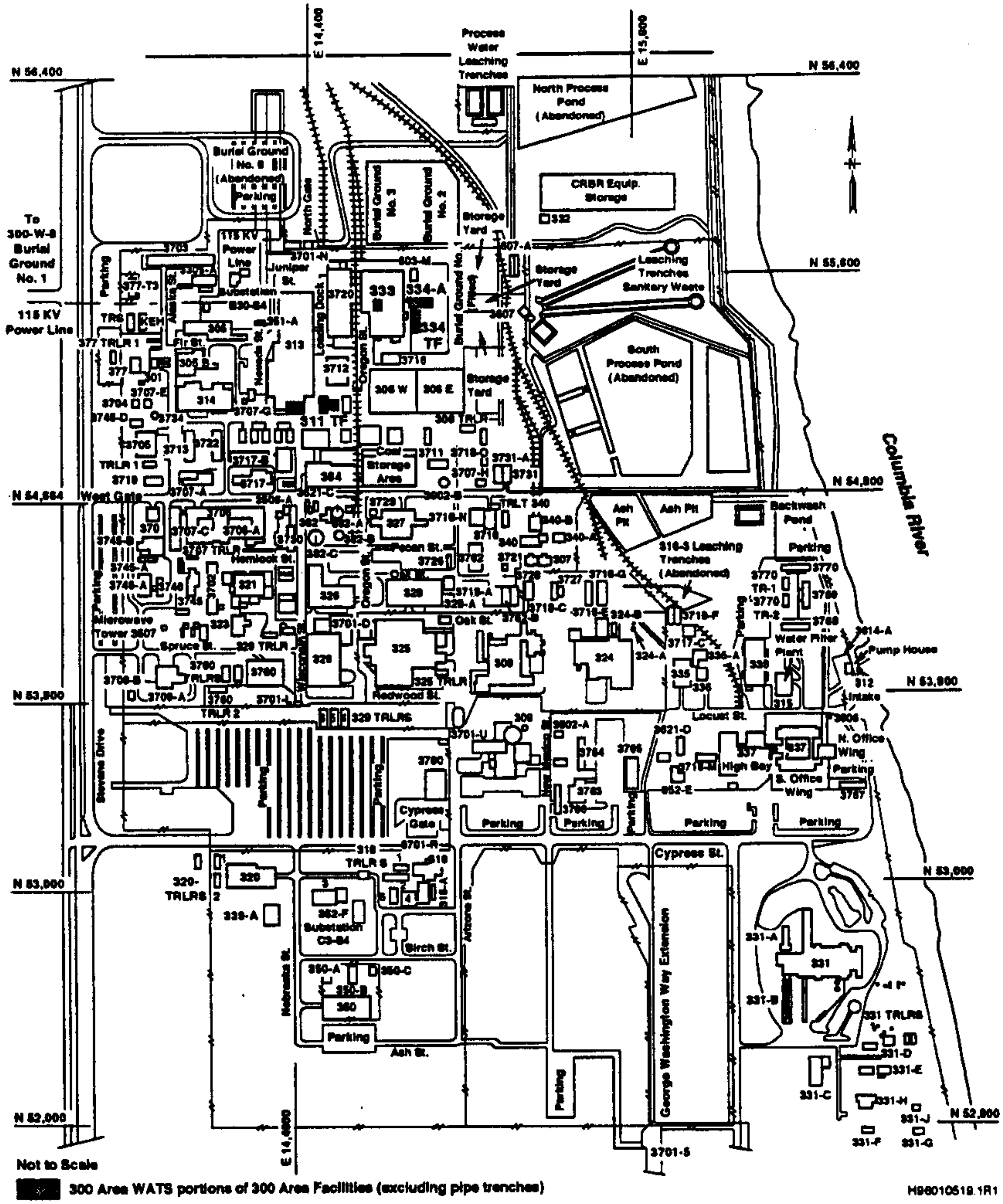


Figure 2-1. 300 Area.

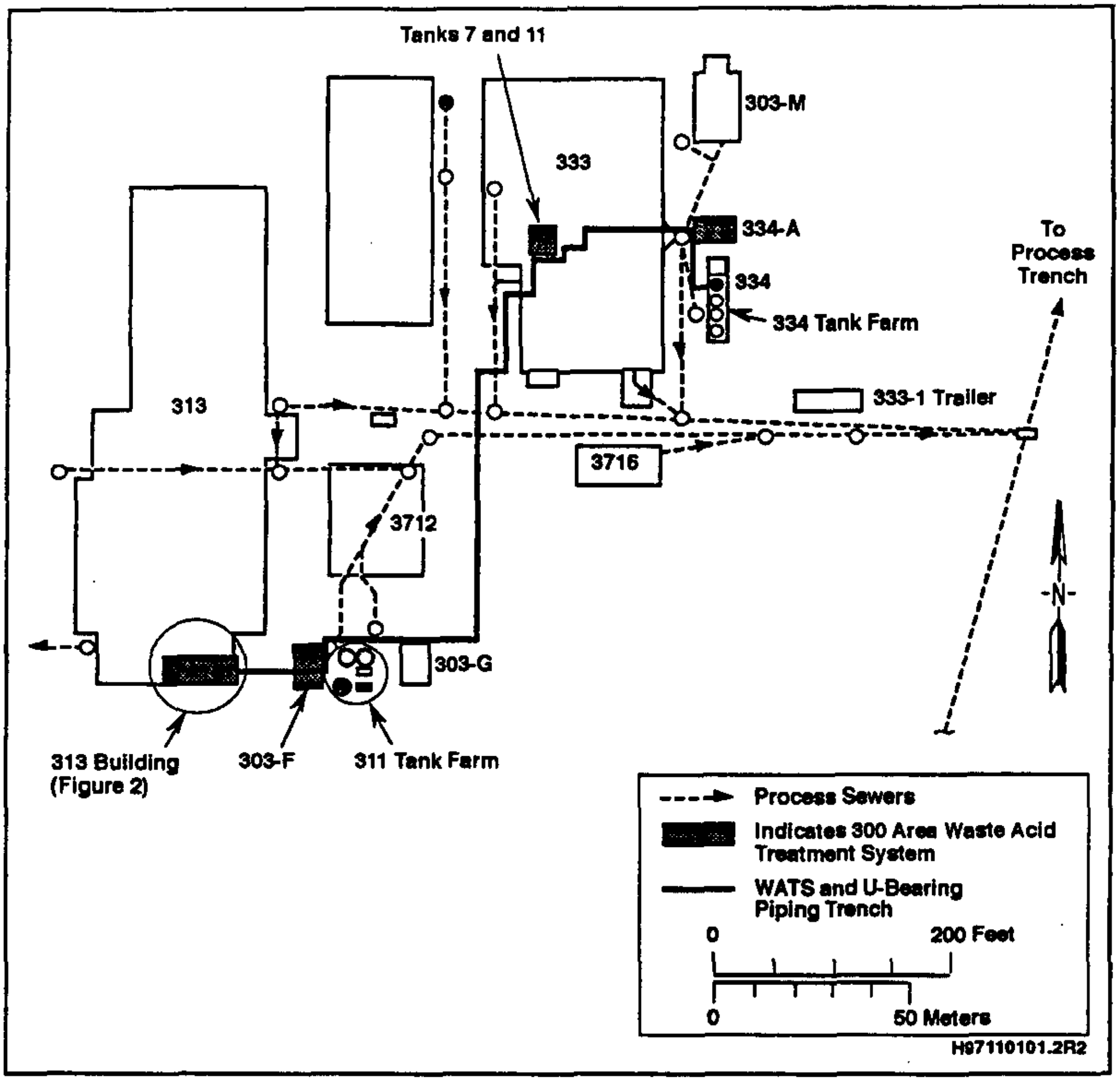


Figure 2-2. 300 Area Waste Acid Treatment System Layout.

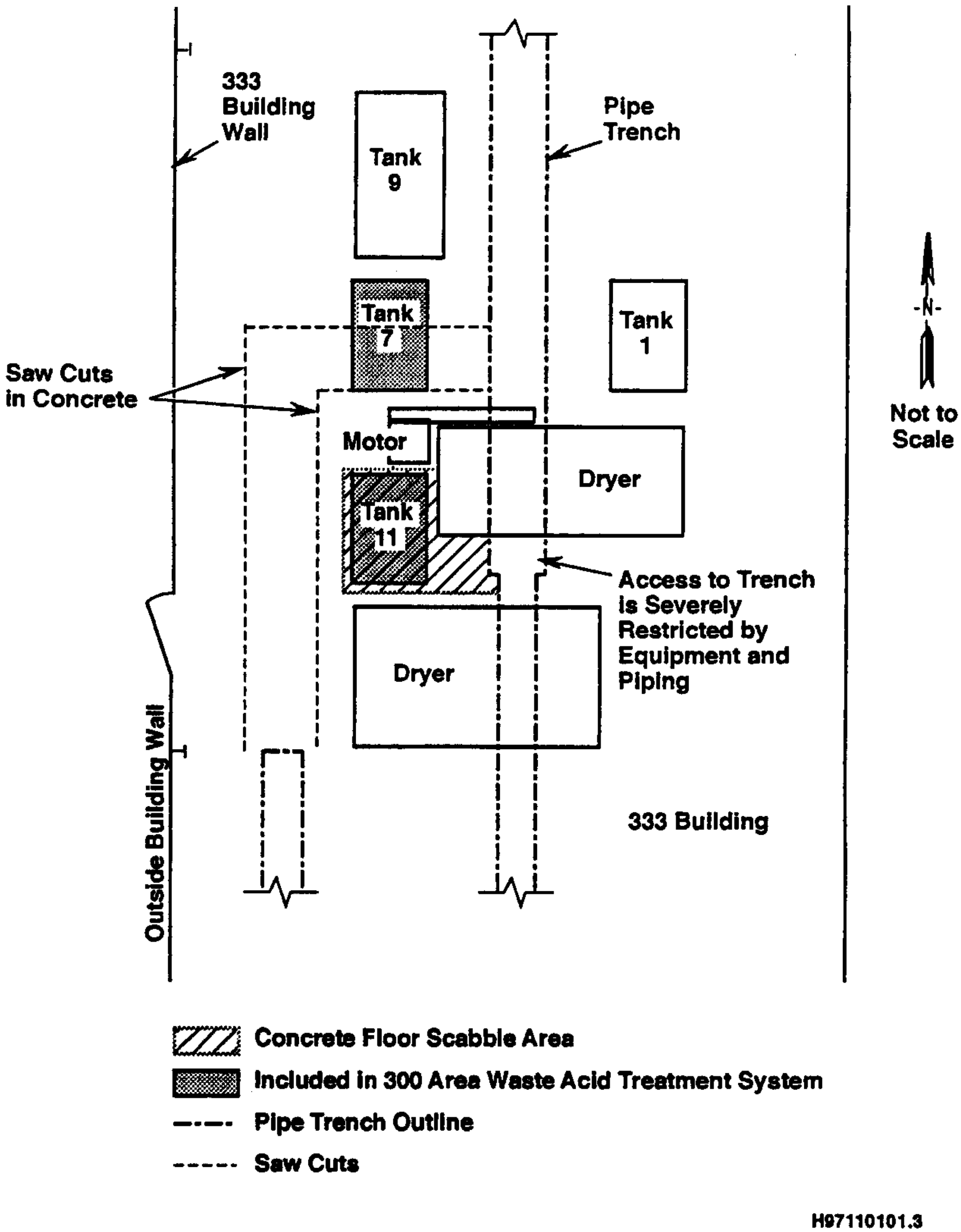


Figure 2-3. 300 Area Waste Acid Treatment System Portion of the 333 Building.

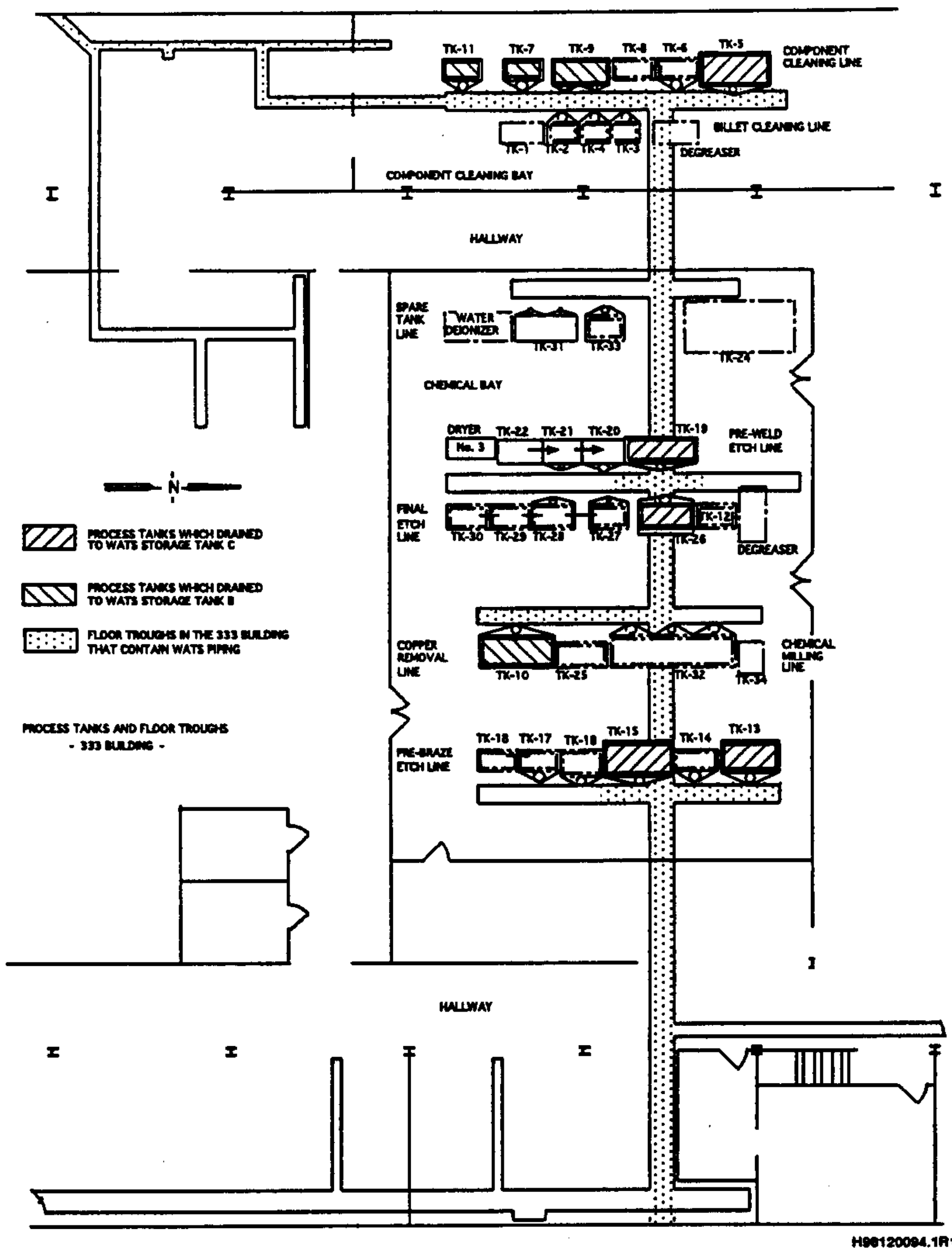


Figure 2-4. 300 Area Waste Acid Treatment System Piping Within the 333 Building.

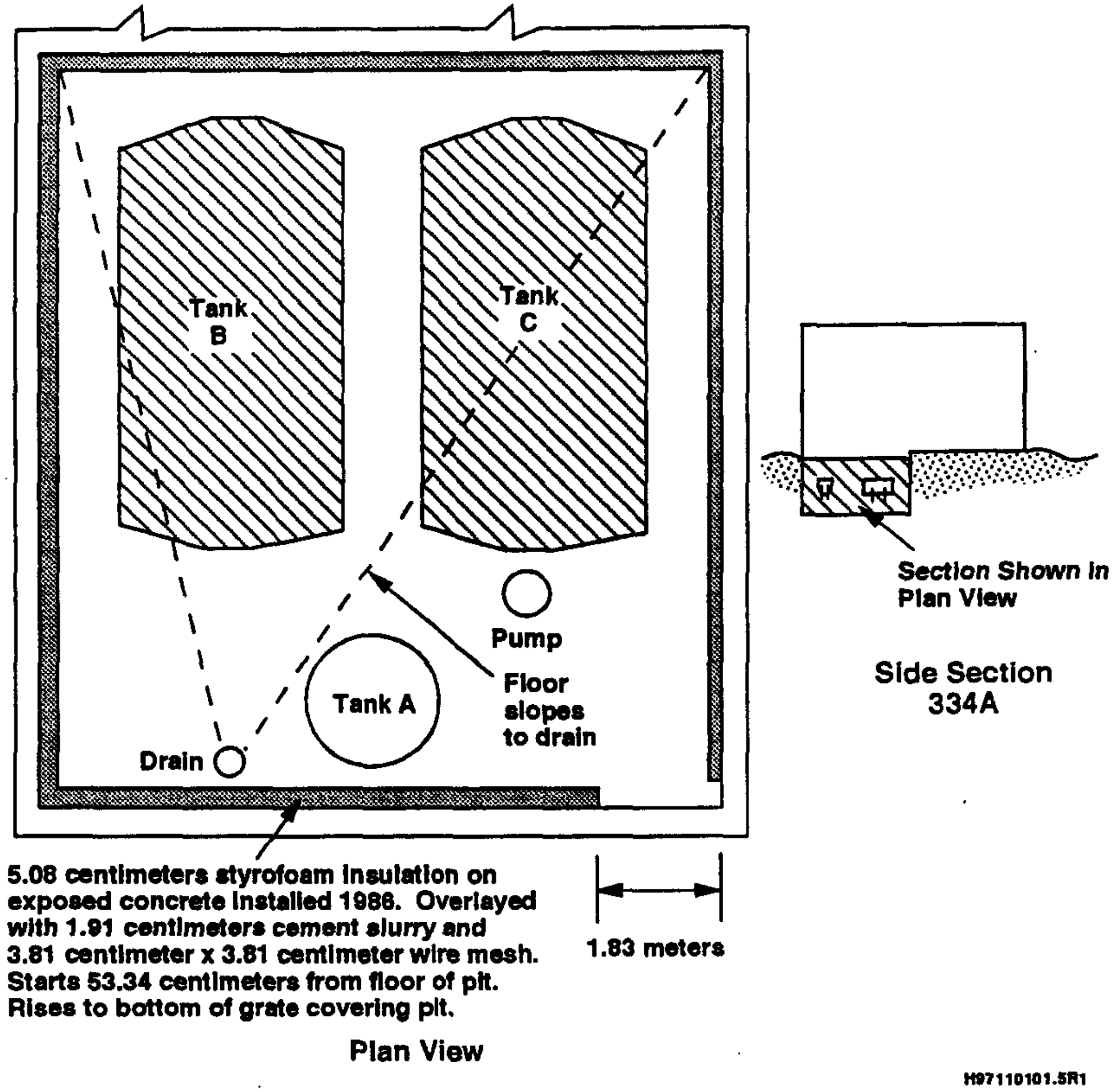


Figure 2-5. 300 Area Waste Acid Treatment System Portion of the 334-A Building.

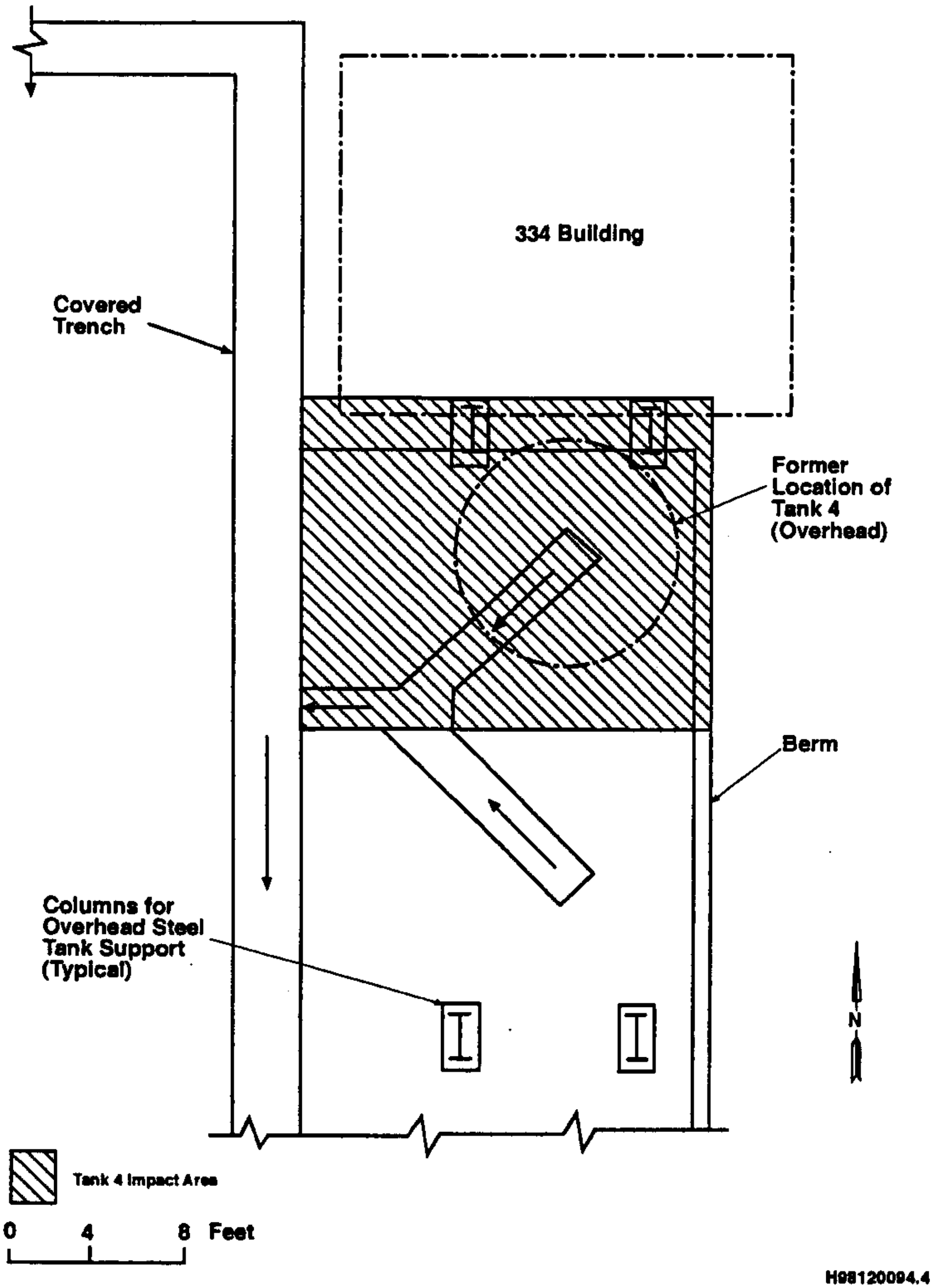
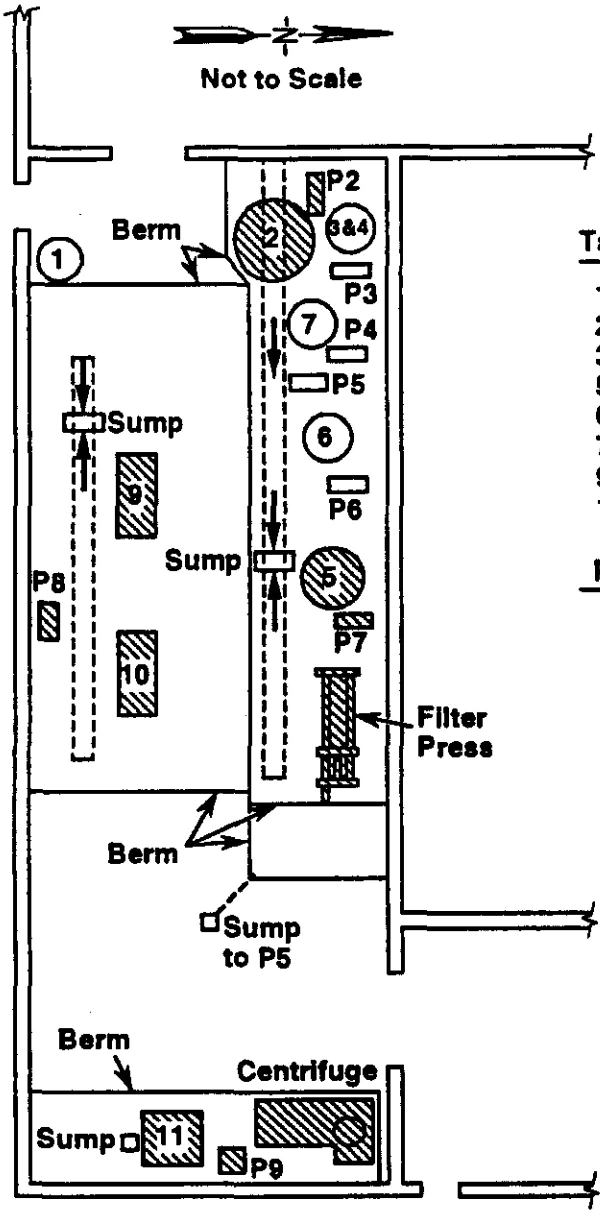


Figure 2-6. 300 Area Waste Acid Treatment System Portion of the 334 Tank Farm.



Tank No.	Use
1	Hot Water Heat Exchanger
2	Waste Acid Neutralizer
3 and 4	Uranium-Bearing Acid Holding Tanks
5	Filter Press Feed Tank
6	NaOH Mixing Tank
7	Uranium-Bearing Acid Neutralizer
9 and 10	Filter Press Effluent Tanks
11	Centrifuge Effluent Tank

Pumps	
P2	Tank 2 Recirculation and Transfer to Centrifuge
P3	Uranium-Bearing Acid Feed to Tank 7
P4	pH Recirculation for Tank 7
P5	Transfer from Tank 7 to 6 or 5
P6	Transfer from Tank 6 to 7
P7	Transfer from Tank 5 Through Filter Press
P8	Transfer from Tanks 9 and 10 to Tank 5 or Outside Storage Tanks
P9	Transfer from Tank 11 to Tank 5 or Outside Storage Tanks

Indicates Waste Acid Treatment System Components

H96010003.1b

Figure 2-7. 300 Area Waste Acid Treatment System Portion of the 313 Building.

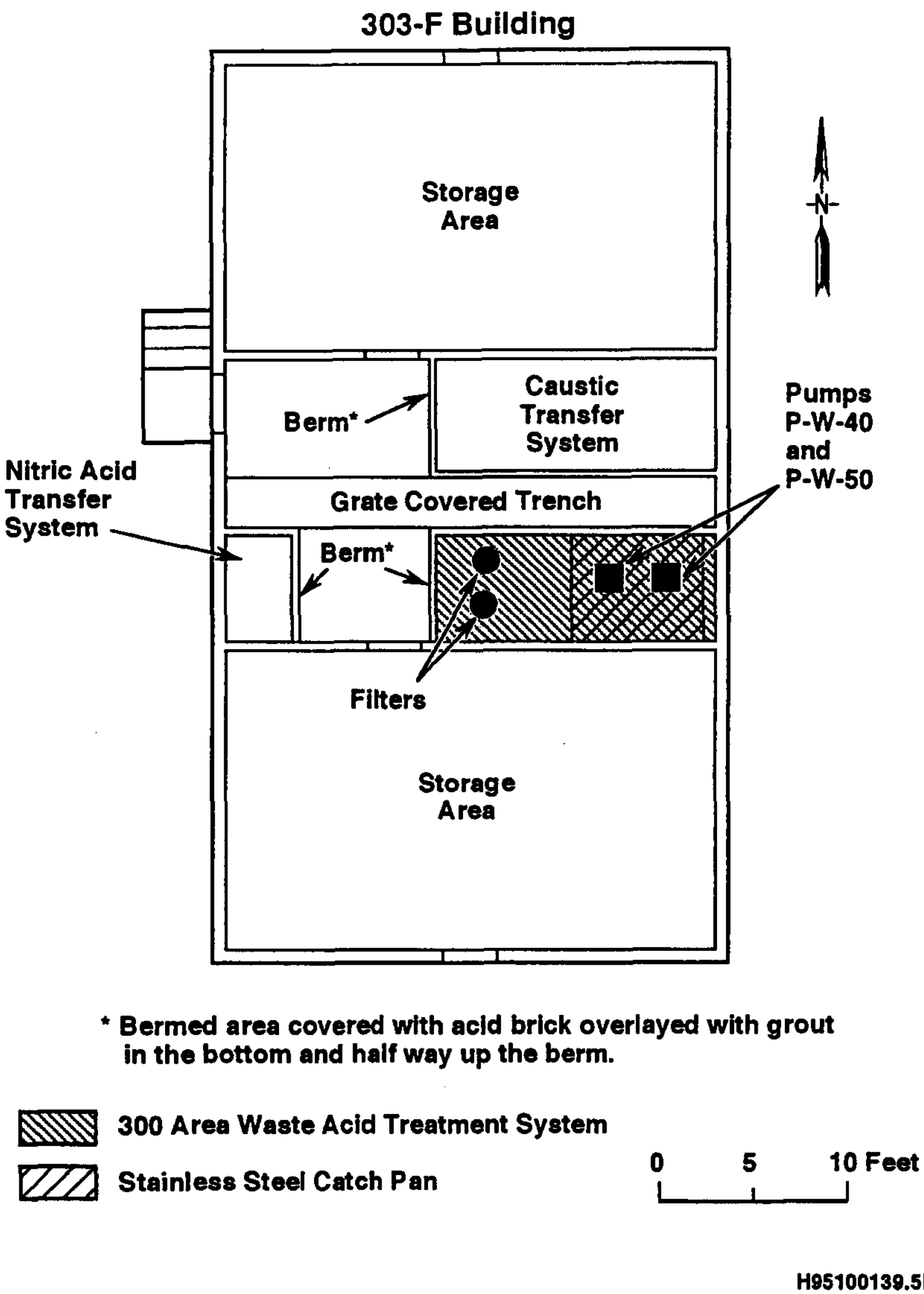


Figure 2-8. 300 Area Waste Acid Treatment System Portion of the 303-F Building.

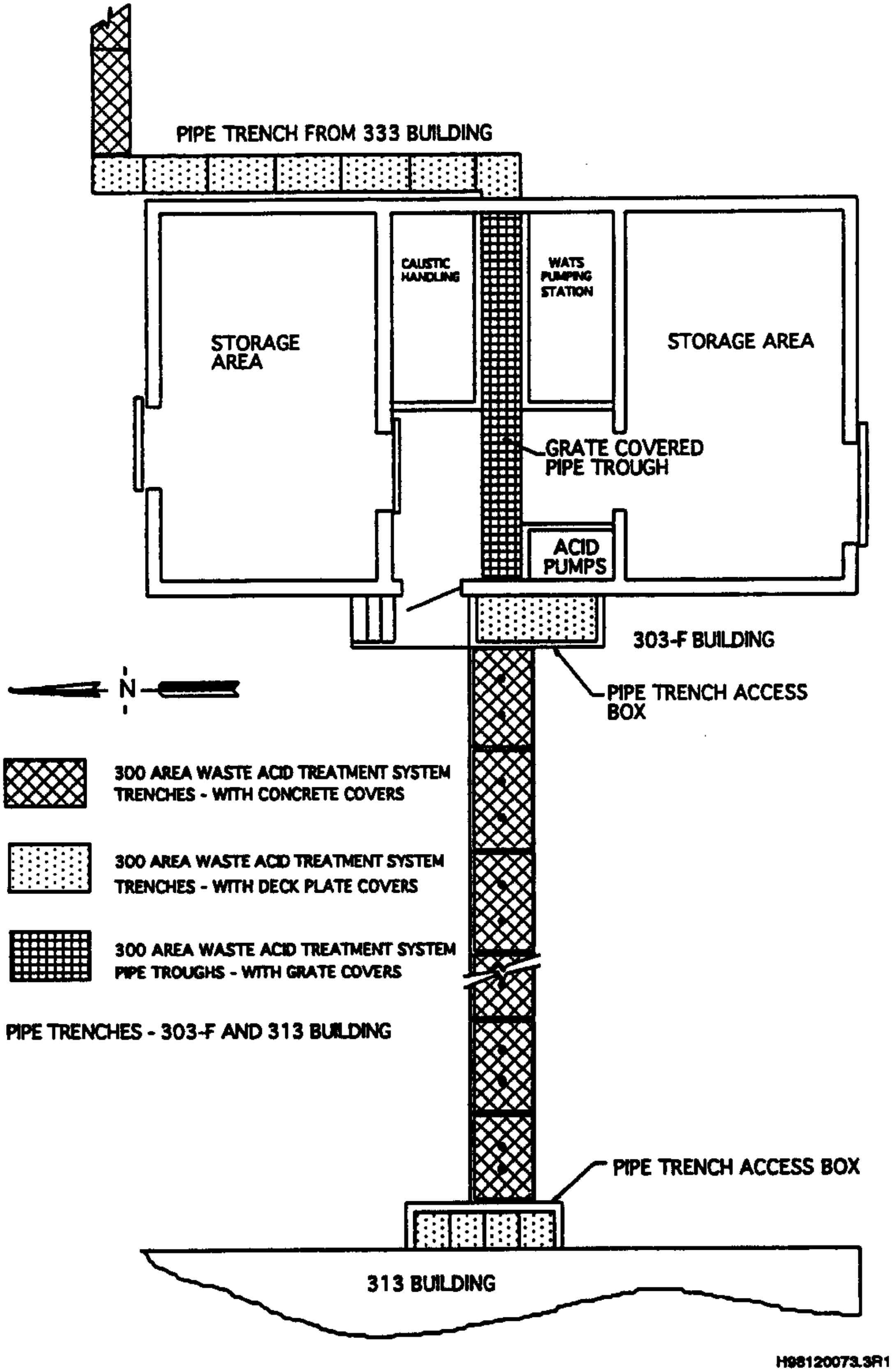


Figure 2-9. 300 Area Waste Acid Treatment System Piping Within the 303-F Building.

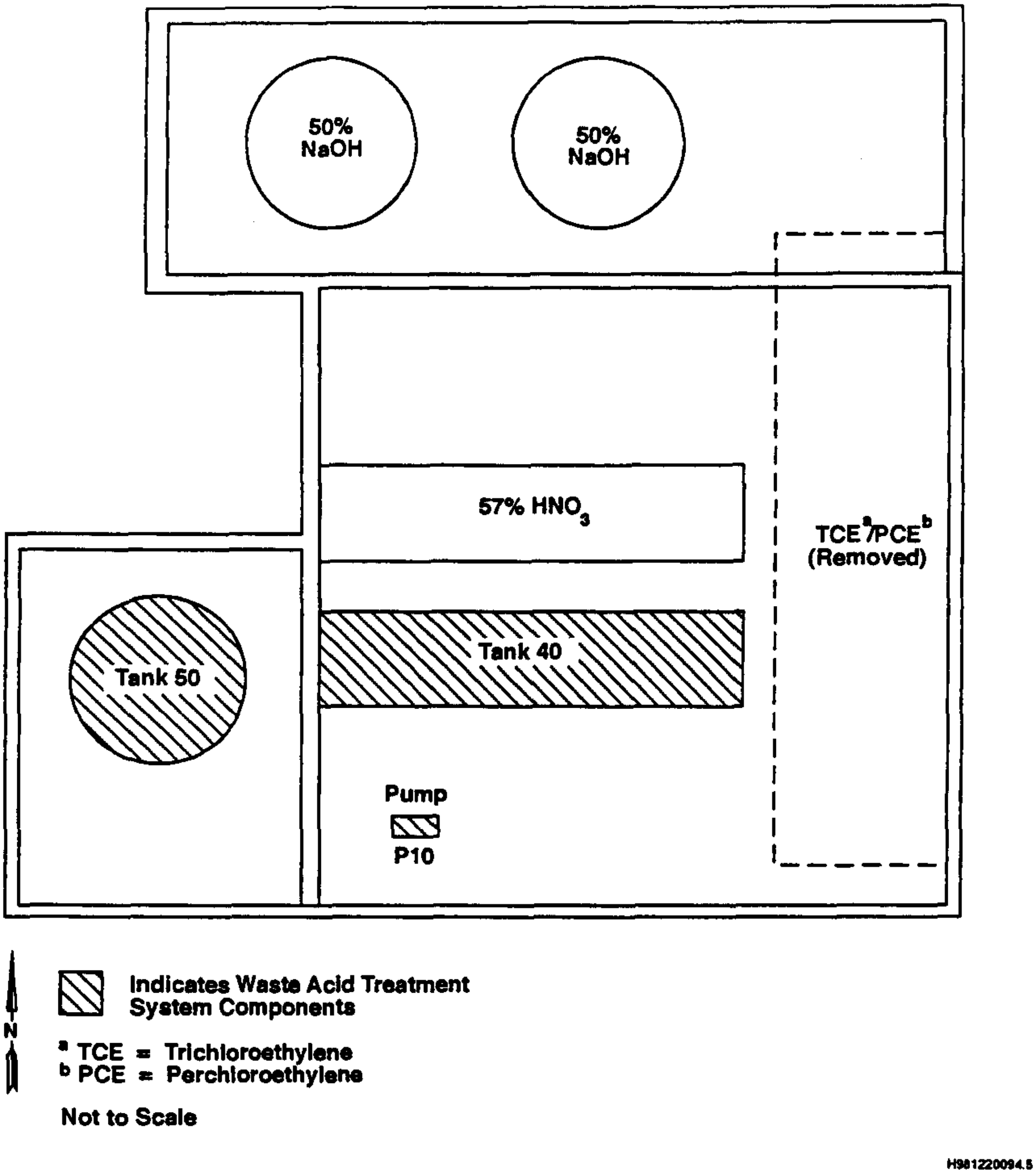


Figure 2-10. 300 Area Waste Acid Treatment System Portion of the 311 Tank Farm.

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APPENDICES

FIGURES

TABLES

3.0 PROCESS INFORMATION

This chapter describes the 300 Area WATS history of operations, the processes that generated the waste acid that was treated, and the treatment and storage process for the waste acid.

3.1 HISTORY OF SYSTEM OPERATIONS

The 300 Area WATS began partial operations in January 1973 with tank storage and treatment of waste acid and entered full operations in 1975. The 300 Area WATS did not begin operations as a RCRA TSD unit until November 19, 1980. The primary source of the waste acid was N Reactor fuel fabrication operations that occurred in tanks in the 333 Building from 1961 until 1987. The waste acids from these operations that contained nonrecoverable uranium were treated in the 300 Area WATS. Because this acid waste contained small amounts of uranium, the waste is considered to have been a mixed waste entering the 300 Area WATS. However, from the beginning of 300 Area WATS RCRA operations, small quantities of waste acids and chemicals from other 300 Area and onsite activities (Section 3.3) also were added and treated in the system as either mixed or dangerous waste.

Until April 1973, waste acid from the 333 Building had been neutralized in a 14,384-liter underground tank that contained limestone located on the east side of the 333 Building where the 334-A Building now stands. The neutralized acid was discharged from this tank to the PS. Between April and August 1973, this tank and tank 4 of the 334 Tank Farm were used to collect acid for transfer to the 313 Building for neutralization in the 300 Area WATS. The tank was removed from service in 1973 when the tank developed a leak and from then until January 1975, waste acid was discharged directly to the 300 Area PS where the acid was neutralized. In January 1975, three new tanks in the 334-A Building began storing waste acid for transfer to the 313 Building for neutralization in tank 2. After neutralization, the waste slurry was pumped to tank 40, located in the 311 Tank Farm.

Until November 1985, tank 40 waste was transported to the 183-H Basins by tank trailer. After November 1985, the neutralized waste acid underwent solids separation in the 313 Building by use of a centrifuge. The solids were containerized in the building, underwent monthly composite sampling and analysis for 300 Area WATS primary process parameters (i.e., pH, ions, metals, and uranium), and were disposed in the LLBG. The liquid effluent was pumped to tank 40 or to the newly installed tank 50. Until March 1988, this effluent was taken from tanks 40 and 50 by tanker truck to the 340-B Radioactive Liquid Waste System for storage while awaiting transport by railcar to the DST System for long-term storage. From March 1988 to July 1995, some nonhazardous, nonradioactive effluent was sent offsite. In July 1995, the last shipment of effluent from tank 50 was pumped via the 340-B Building to a tanker truck and transported to the DST System.

3.2 WASTE STORAGE AND TREATMENT PROCESSES

The following sections summarize the process information for each of the facilities included in the 300 Area WATS. This plan does not include those tanks and associated pumps and piping used solely for uranium recovery.

Historical information regarding spills to the 300 Area WATS location that either predated RCRA operations or were from non-300 Area WATS components is presented for information only in Appendix 3A, Table 3A-1 and 3A-2, respectively. These non-RCRA spills will be addressed at the time of final disposition of affected locations in accordance with past-practice processes (Chapter 1.0) where not incidentally closed out during 300 Area WATS phased closure activities. Table 3-1 identifies spills to 300 Area WATS containment and to the piping trench that will be tracked to final disposition as a requirement of 300 Area WATS closure (Chapter 1.0). All documented 300 Area WATS releases have been identified in waste identification data system (WIDS).

The WATS and U-Bearing Piping Trench constitutes the RCRA/CERCLA interface between the 300 Area WATS RCRA closure and the future 300-FF-2 OU remedial action. Soils beneath the portions of the trench identified in Figure 3-1 are within the scope of 300 Area WATS closure. As previously agreed to by RCRA and CERCLA regulators and by effected DOE-RL programs in a meeting on September 3, 1998, the WATS and U-Bearing Piping Trench infrastructure will be investigated and undergo D&D as part of the 300-FF-2 OU remedial action, outside the scope of 300 Area WATS closure (refer to Appendix 6B). The entire trench has been identified in WIDS for tracking to final disposition under site code 300-224.

3.2.1 333 Building

The only 300 Area WATS components of the 333 Building are tanks 7 and 11, and PVC drain lines from process tanks 5, 7, 9, 10, 11, 13, 15, 19, 26, and 31 to storage tanks in the 334-A Building. The 300 Area WATS portion of this piping begins at the drain valve below each of these process tanks.

The fuel fabrication operations that occurred in these process tanks included component cleaning, acid copper removal, end recessing chemical milling, prebraze cleaning, preweld cleaning, and final bright etch steps. 300 Area WATS tanks 7 and 11 were used for component cleaning. Tank 11 was used for deoxidation of copper and copper-silicon components in Zinctone[1]. Tank 7 was used to rinse components with water after deoxidation in tank 11. Twice per year, chromium (Cr+6) in the solution in tanks 7 and 11 was reduced to Cr+3 with sulfuric acid and sodium sulfite before discharge to the 334-A Building

Information regarding process, capacity, chemical output, and solution changeout schedule for each tank is presented in Table 3-2. The waste from these tanks was drained through the PVC drain lines to the 334-A Building storage tanks. The chemical output from these tanks primarily consisted of hydrofluoric, nitric, and sulfuric acids with copper, zirconium, chromium, and uranium in solution.

The only 300 Area WATS known spill to the tank 7 and 11 location occurred August 17, 1981 (Table 3-1). Sawcuts in the floor near tanks 7 and 11, described in Chapter 2.0, Section 2.1.2, likely were not exposed to this spill. A relatively small quantity of acid, 397.5 liters, leaked over the period of a weekend from a defective drain valve directly under tank 11. This leak would have flowed directly into the nearby floor trench and would not have overcome the 10 centimeter per meter upward slope of the floor away from the drainage trench to reach the sawcuts or to have laterally spread beyond the width of tank 11. Only one fine surface crack is visible in the floor in the vicinity of tanks 7 and 11. This crack, which emanates from an area where the concrete surface has deteriorated, is too fine to have provided a pathway to soil for spilled effluents.

3.2.2 334-A Building (Storage)

Before 1975, the 334-A Building site was occupied by a 3,800-gallon underground neutralization tank containing limestone. In 1973, this tank failed and leaked waste acid solution to the soil.

[1] Zinctone is a trademark of Turco Products, Inc.

Characterization or remediation of soil with respect to this leak will be performed by the remedial action process for the 300-FF-2 OU. The 334-A Building was completed in late 1974 and entered service in January 1975 to replace the failed tank.

Three tanks (A, B, and C) in the 334-A Building were used to store waste acids from the 333 Building. Tank A, with a capacity of 1,363 liters, was used as an inline settling tank. Tanks B and C, with a capacity of 7,570 liters each, were used for storage. Waste gravity-drained from the 333 Building to the 334-A Building via PVC transfer pipe. The tanks received approximately 794,905 liters of waste acids per year from the fuels fabrication process.

In the early 1980's, in an effort to reduce sludge build-up, the waste stream from the 333 Building was separated into copper-bearing and zirconium-bearing streams directed to tanks B and C, respectively. In August 1984, the piping to tank A was disconnected, and all waste was routed directly to tanks B or C.

The tank pit contained a spill sensor set to alarm at approximately 1.27 centimeters above the high point of the floor. If a leak occurred to the pit, an alarm sounded in the 333 Building chem bay. The collected solution was sampled and analyzed. If acidic, the solution was pumped into tank A or B. If process water, the solution was released to the PS.

A plastic pump (now removed) in the 334-A Building pit transferred the waste acid through 293 meters of 2-inch-diameter PVC transfer pipe from the 334-A Building tanks to neutralization tank 2 in the 313 Building. The waste was pumped at a rate of approximately 19 to 38 liters per minute to control the heat of neutralization.

Table 3-1 presents a description of spills that are known to have occurred in the 334-A Building portion of the 300 Area WATS since the beginning of RCRA operations.

One large spill occurred in the tank pit in June 1978 (Appendix 3A, Table 3A-1) when fluid levels rose above the 60-centimeter-high standpipe. This was caused when a process water fill line to a 333 Building process tank was left on for 2 days. The standpipe was removed and replaced with a PVC plug and since then there have been only minor spills, primarily leaks from valves or pump fittings. Tank exteriors and the sealed pit floor and pit walls to approximately 60 centimeters above the floor have been in contact with waste acid resulting from accidental spills. No cracks exist in the tank pit floor or walls that could have provided a pathway to soil for contamination from 300 Area WATS operations

3.2.3 334 Tank Farm (Storage)

From 1975 to 1986, tank 4 in the 334 Tank Farm was available for use as an overflow tank for the tanks in the 334-A Building. Although usually empty, tank 4 was used to store waste acid solutions in January 1986 because of equipment problems in the 313 Building. Shortly after that transfer, tank 4 developed holes near the top. The tank maintained integrity below the failure line and no more leakage was reported after the original loss. In the late summer of 1988, tank 4 was removed and disposed in the LLBG. The 334 Tank Farm is outdoors and uncovered. Table 3-1 describes the only spill of waste acid that occurred at the 334 Tank Farm during RCRA operations (tank 4). This spill remained contained by the pad and did not reach soil. Exposure to weather over many years is expected to have rendered the tank support structure and concrete pad naturally decontaminated from the single spill in 1986 (tank 4).

3.2.4 313 Building (Treatment and Storage)

In January of 1975, nonrecoverable uranium-bearing waste acids were pumped fulltime from the 334-A Building into tank 2 in the 313 Building for neutralization with sodium hydroxide to achieve a pH of 10 to 12. Following neutralization, the metals in this waste (Chapter 7.0, Table 7-1) were present primarily in the form of precipitates. Until 1985, the neutralized waste slurry was transferred to tank 40 in the 311 Tank Farm.

In November 1985, a centrifuge was installed in the 313 Building to perform solids separation on the waste slurry. Solids from the centrifuge were drummed and transferred within 90 days to the 303-K Storage Facility for storage or to the LLBG for disposal. Table 3-3 identifies the quantity and makeup of the waste shipped to LLBG. A sample from each drum was taken for chemical analysis. Additionally, a composite sample of all drums in one neutralization tank run was analyzed for uranium. Sample results, along with the gross, tare, and net weight of each drum, were recorded in a logbook. A monthly composite sample of drummed material was analyzed and recorded for constituents such as chromium, copper, nitrate, and fluoride.

The liquid from the centrifuge was discharged to tank 11. Pump 9 transferred effluent from tank 11 to tank 5 that fed a filter press used to further clarify the effluent. Effluent from the filter press flowed by gravity to tanks 9 and 10, examined visually for clarity and, if clear, pumped to tank 40 or tank 50. If cloudy, the effluent was pumped back to tank 5 to be recycled through the filter press.

Until mid 1987, the solids from the filter press were included with the recyclable uranium-bearing sludge shipped to the Feed Material Production Center in Fernald, Ohio.

Table 3-1 describes known spillage to the 300 Area WATS portion of the 313 Building since the beginning of RCRA operations. The floor and drainage trenches have a history of exposure to chemical spills and floor coatings might have covered contamination from spills. In the early 1970's, the PS under the floor on the west side of the room had leaked to ground for an undetermined period of time, potentially contaminating the soil under the west side of the building with uranium, copper, and other substances (BHI 1993). This potential soil contamination will be addressed by the past-practice processes (Chapter 1.0). No cracks exist in this floor that could have provided a pathway to soils for contamination from 300 Area WATS operations. However, soil beneath the portion of the floor identified in Figure 3-2 could have been contaminated by 300 Area WATS operations through defective drains.

3.2.5 303-F Pumphouse (Waste Transfer and Filtration)

The 303-F Pumphouse began 300 Area WATS operations in November 1985. Before this time, building pumps were used to transfer 50 percent sodium hydroxide from tanks in the 311 Tank Farm to neutralization tanks 2 and 6 in the 313 Building. In November 1985, two new pumps, cartridge filters, and sample ports were installed in the 303-F Pumphouse to recirculate and filter waste acid solutions while in tanks 40 and 50 of the 311 Tank Farm, and also to transfer solutions back to tank 5 in the 313 Building.

No spills to this location have been documented since the beginning of 300 Area WATS RCRA operations in November 1985. However, white residues are visible on the filter cartridges, piping, catch basin liner, and acid brick indicating a potential for surface contamination. Although not visible on the white painted surface of the adjacent concrete block wall, the residues also could exist there. The mortar between the acid bricks that cap the basin shows numerous fine cracks. The catch basin prevented any contamination from RCRA operations from reaching soil at this location.

3.2.6 311 Tank Farm (Storage and Treatment)

From 1973 to 1985, neutralized WATS and U-Bearing system effluents from the 313 Building were combined for storage and treatment in aboveground tank 40 in the 311 Tank Farm. Tank 40 waste was transferred to the 183-H Solar Evaporation Basins. The quantity is identified in Table 3-4. In November 1985, tank 50 was installed in the 311 Tank Farm to also store neutralized effluent. Tank 50 also was used four times during 1986 and 1987 to decant waste when the centrifuge was out of service. Decanted effluents were transferred to tank 40. The tanks received approximately 1,589,868 liters of waste solutions per year.

The neutralized effluent was stored in tanks 40 and 50 until it exited the 300 Area WATS by being pumped, using pump P10, to a tanker truck. The tanker truck transported the effluent to the 340-B Building, where the effluent was pumped into holding tanks. Table 3-5 identifies the quantity and makeup of the waste transferred to the 340-B Building. From the 340-B Building, the effluent was pumped to railcars for transport to the DST System. A sample of each tank trailer load was taken for chemical analysis. A logbook was kept on the volume of each load, the pH, the concentration of sulfate and uranium, and on whether the liquid was free of particulate. Additionally, the monthly environmental performance reports listed the amounts and constituents of neutralized waste acid transferred to the 340-B Building or offsite. A monthly composite sample was analyzed and recorded for constituents such as chromium, copper, nitrate, sulfate, and uranium.

The basin valve drain remained closed during operations except when draining precipitation accumulations. Before draining normal precipitation, the effluent was sampled for pH (because the neutralized waste generally was caustic) to confirm that there had been no spills. After known spills, basin effluent was pumped back into the 300 Area WATS. Basin drains are now kept open to preclude precipitation accumulation. Table 3-1 describes known spills to the 300 Area WATS portions of the 311 Tank Farm during RCRA operations. There are no documented spills to the tank 50 catch basin, no visual evidence of waste exist, and the basin retains the original surface coating.

In 1988, tank 40 catch basin was resurfaced. Until then, spills to the tank 40 catch basin had been washed to the PS via the WATS and U-Bearing Piping Trench. Only minor spills (Table 3-1) were recorded during RCRA operations and before resurfacing and no spills are documented after resurfacing in 1988. No waste was managed at the location before the coatings began to fail after 1995 (Chapter 2.0, Section 2.1.7). No cracks in the 311 Tank Farm catch basins exist that could have provided a pathway to soil for contamination from 300 Area WATS operations.

3.3 NONROUTINE CHEMICAL ADDITIONS

Beginning in 1975 and ending in 1988, waste acids and chemicals that were not from 333 Building operations were added to various locations of the 300 Area WATS. The additions made during the RCRA timeframe (since 1980) and the points at which the additions were made are summarized in Table 3-6. Nonroutine chemical additions to the 300 Area WATS before RCRA operations are summarized in Appendix 3B.

These waste additions consisted of used and unused acid and caustic chemical solutions. The waste often contained dangerous waste constituents (e.g., heavy metals) and sometimes radionuclides (primarily uranium), and could have been designated as mixed or dangerous waste on addition to the system. This waste was generated from decontamination, electroplating, battery acid disposal, X-ray film development, various research and development projects, and fuel fabrication (other than routine 333 Building processes).

Until early 1986, this nonroutine waste was added to the treatment system at tanks 9 and 10 in the 313 Building or at previously existing tanks 12, 14, 15, and 16 in the old 313 Building cleanup line. Waste added at tanks 9 and 10 was transferred directly to the 311 Tank Farm. Waste that was added to non-300 Area WATS tanks 12, 14, 15, and 16 in the old 313 Building cleanup line might have been pumped back to the 334-A Building for further treatment and, at that point, would have become 300 Area WATS waste.

Beginning in August 1986, waste was allowed to be added to the system at any of the following locations using a barrel pump: (1) tanks 9 or 10 in the 313 Building, (2) tanks B or C in the 334-A Building, or (3) tank 2 in the 313 Building. The chemical waste disposal permits did not specify the location of the addition.

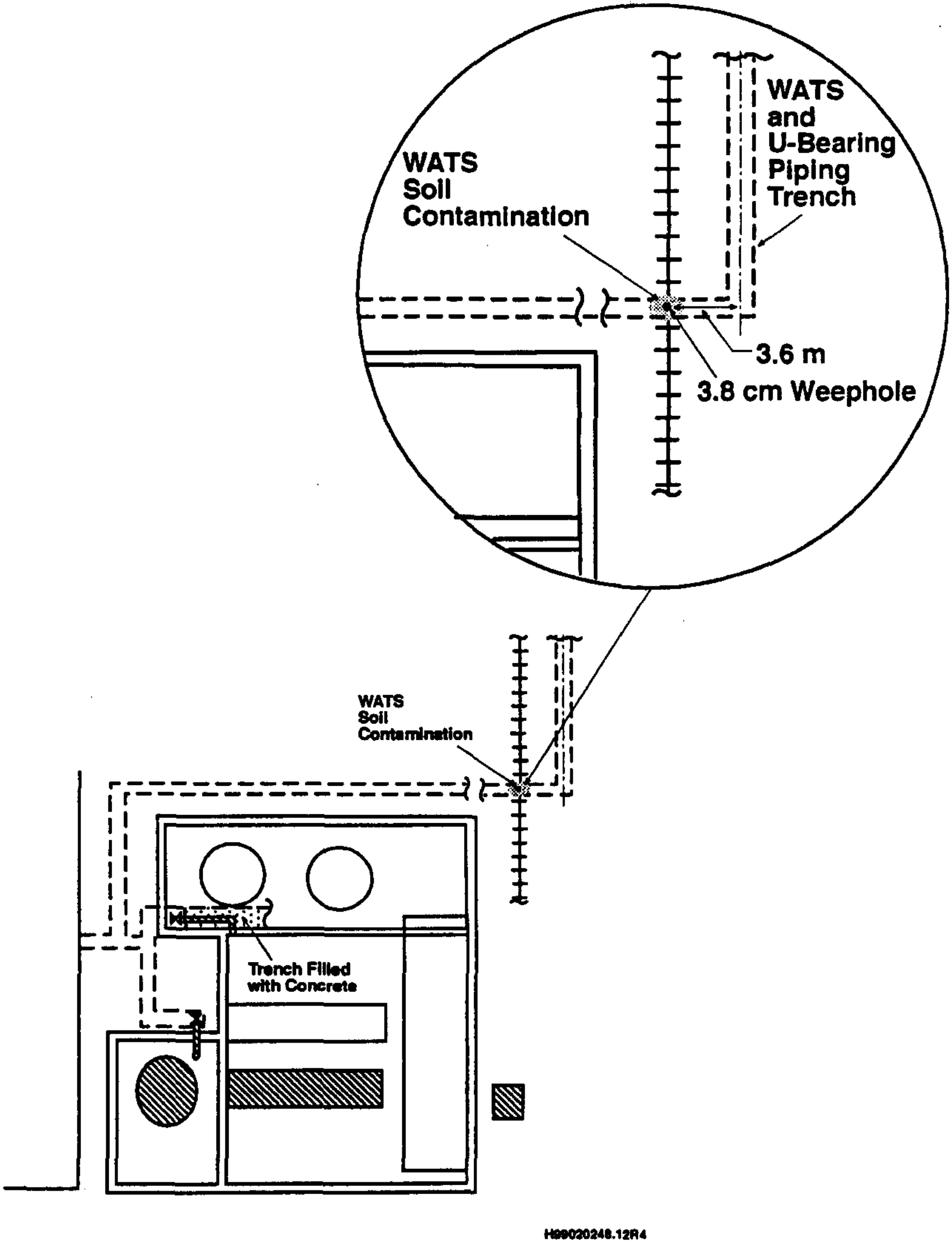

Figure 3-1. 300 Area WATS Related Soil Contamination Beneath the WATS and U-Bearing Piping Trench.

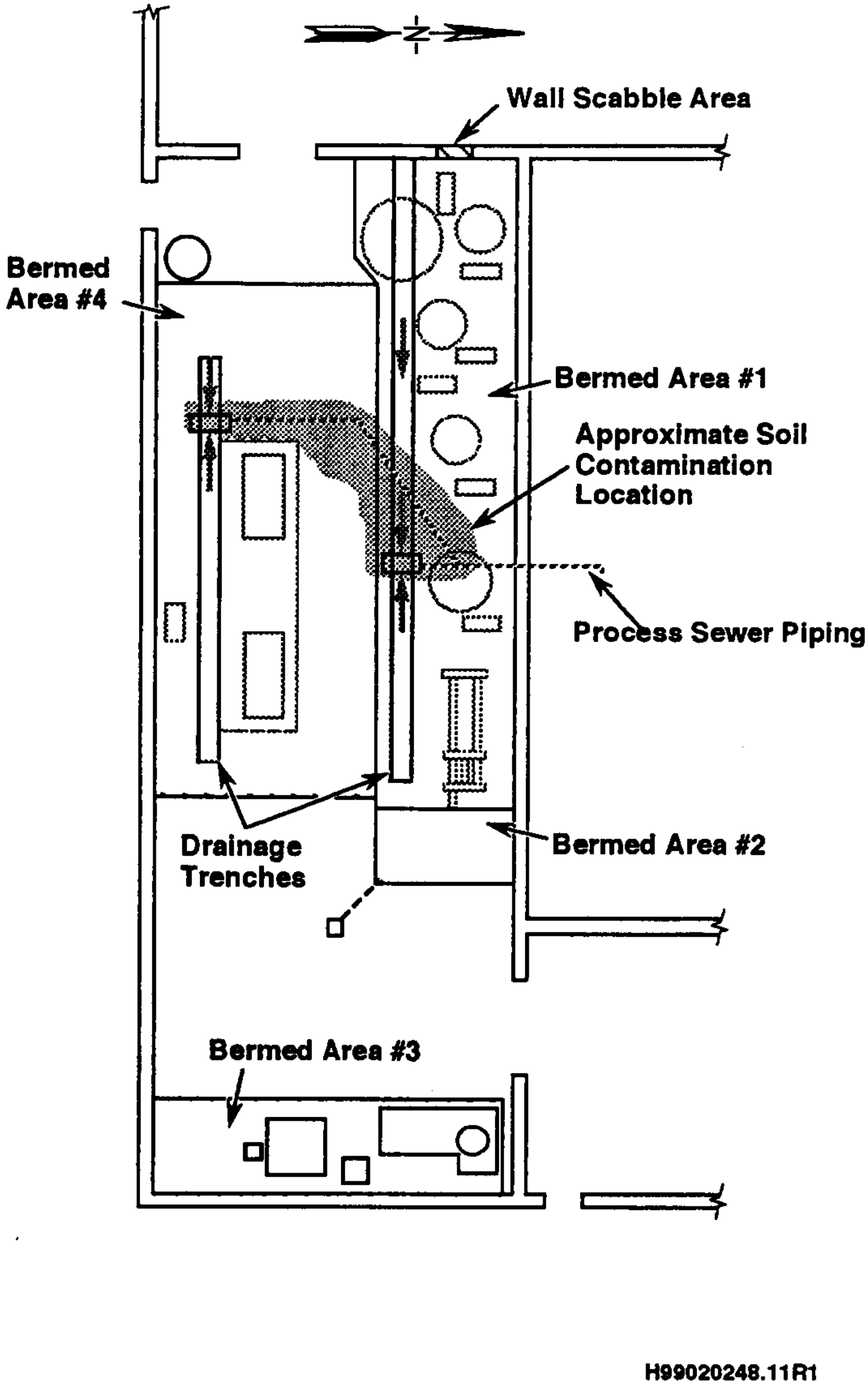

Figure 3-2. 313 Building Subfloor.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
333 Building	08/17/81	Tank 11	Newly mixed acid solution	HNO_3, H_2SO_4, and CrO_3 acid solution	105 gal	Slow leak from defective drain valve.	Drained to process sewer.	This could have released 20 lbs of Cr^{+6} to the process sewer.
334-A Building	09-16-82	Pipe trench between 334-A Building and 333 Building in component cleaning area.	Waste etch acids	HNO_3, HF, H_2SO_4, and CrO_3 acids containing uranium, copper, and zirconium in solution	Exact quantity unknown. However, more than 100 gal was discharged.	The PVC waste acid transfer line broke, resulting in discharge to the process sewer. Weekly process sewer sample for the 333 Building showed elevated copper levels (3.9 ppm).	Pipe was repaired. Flushed leak area into process sewer.	Comparing the copper content in the weekly process sewer sample (3.9 ppm) with a normal average concentration (0.3 ppm), it appears that 82 lb of copper could have been released in this event. This would indicate that the current CERCLA RQ for $Cu(NO_3)_2$ (100 lb) would have been exceeded with this spill.
	11-22-82	334-A Building - storage tanks	Waste etch acids	HNO_3, HF, H_2SO_4, and CrO_3 acids containing uranium, copper, and zirconium metals in solution	Exact quantities unknown (see comments)	In attempting to backflush a transfer line to clear blockage, water was discharged into storage tanks, causing overflow. Weekly 333 process sewer sample showed an elevated level of fluoride (4.1 ppm).	Spilled solution was flushed into process sewer.	Based on average F^- content of 1.4 ppm (weekly process sewer composite sample). 75 lb of HF could have been involved in the spill. Copper content in weekly composite sample also was elevated (1.7 ppm vs 0.4 ppm in a normal week) indicating that 35 lb of copper ion [105 lb $Cu(NO_3)_2$] could have been discharged in the spill event. The process sewer stream pH was 1.3 to 2.0 for ~45 min during the course of the spill. This would indicate a release of up to 350 lb of HNO_3 (assuming a process sewer stream flow of 500 gal/min). The current CERCLA RQs are: HF (100 lb), $CU(NO_3)_2$ (100 lb), HNO_3 (1,000 lb).
	1-03-83	334-A Building - storage tanks	Waste etch acid	HNO_3, HF, H_2SO_4, and CrO_3 acids containing uranium, copper, and zirconium in solution	1,500 gal	A siphon condition was established in the overflow piping on tank 10. Acid was added to tank 10 at the same time solution from Tank 26 was run into the waste piping system. As a result, the overflow piping remained submerged and continued to siphon through the waste piping and into the 334-A tanks. The B and C tanks overflowed into the pit area.	Acid was pumped from building pit to a tanker truck. Modifications were made to system to prevent future spills by siphoning.	No discharges to the process sewer.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334-A Building (cont)	1-05-83	334-A Building - storage tanks storage	Waste etch acids	HNO_3, HF, H_2SO_4, and CrO_3 acids containing uranium, copper, and zirconium in solution	200 gal	When tank 15 was drained to the 334-A Building, the B and C tanks overflowed. Depth gages did not work properly.	Acid was cleaned up and not allowed to enter the process sewer.	Depth gages and high-level alarms were recalibrated.
	08-15-83	334-A Building - storage tanks	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Approximately 100 gal of acid solution	333 Building process sewer analyses showed elevated levels of copper (2.2 ppm). Apparent cause was clean out of storage tanks in 334-A Building. Pump used to transfer material from tanks was leaking; leakage was discharged into process sewer.	None.	Based on normal average copper content in weekly process sewer sample of 0.3 ppm and using a total process sewer flow of 2,874,700 gal, it is estimated that 45 lb of copper could have been involved in this release. This corresponds to 135 lb expressed as $Cu(NO_3)_2$.
	10-27-83*	334-A Building - storage tanks	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Unknown volume. Refer to description of event and comment columns for estimated weights.	Following desludging of the 334-A storage tanks, leak testing with water routinely was pursued. The water used for this effort was discharged into the process sewer. In the 10-27-83 effort, one of the tanks apparently had not been desludged and the leak test solutions (containing the waste acids and crystalline sludge) mistakenly was discharged into the process sewer. The weekly 333 process sewer sample showed elevated levels of fluoride (15.8 ppm) and copper (3.6 ppm) and a low pH (2.87).	When operator recognized that acidic solution was being discharged, the release was halted.	Based on the weekly process sewer composite sample, and using normal average values for fluoride (1.2 ppm), copper (0.3 ppm) and pH (3.8), the release could have involved as much as 500 lb of HF, 100 lb of copper, and 860 lb of HNO_3. Total weekly process sewer flow averages 3,940,900 gal. Current CERCLA RQs for these materials are HF (100 lb), $CU(NO_3)_2$ (expressed as copper) (34 lb), HNO_3 (1,000 lb).
	08-29-85	Pipe trench between 333 Building and 303-F Building. West side of 333 Building.	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing uranium, copper, and zirconium metals in solution	Apparently a small quantity	Leak testing of PVC acid transfer system revealed a leak in the line. This leak had spilled onto a carbon steel pipe below, corroding the line and resulting in spillage of the trench heating system solution (ethylene glycol) contained therein.	Material remaining in pipe trench (that which hadn't reached process sewer) was neutralized, absorbed, and cleaned up.	Acidic solution reaching process sewer was apparently of low quantity, as weekly process sewer composite sample did not show any attributable increases in levels of NO_3-, F-, or copper or any decrease in pH. (Indicates that release was insignificant in comparison with routine operational discharges.)

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334-A Building (cont)			Trench heating system solution	50% ethylene glycol solution	50-75 gal		Piping leaks were repaired.	—
	01-02-86	334 Tank Farm - Tank 4	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Approximately 350 gal of solution containing 170 lb of HF acid	Failure of liner in waste acids storage tank resulted in corrosion of carbon steel shell, followed by acid leakage into the process sewer.	The tank contents were removed to prevent further discharge. Approximately 60 gal of 50% NaOH was discharged into the process sewer in an attempt to maintain a caustic pH at the process trenches. Special groundwater monitoring was initiated at 300 Area wells to determine impact of release. Spill area was flushed into the process sewer.	Release was reported as CERCLA RQ event due to HF quantity, which exceeded CERCLA RQ of 100 lb. Based on comparison of average weekly process sewer composite sample levels with levels measured for the week of the spill, it is estimated that the release also involved 700 lb of HNO_3 (79 ppm vs 57.5 ppm in a typical week); 16 lb of copper (0.7 ppm vs 0.2 ppm typical); and 20 lb of uranium (0.9 ppm vs 0.27 typical). (Estimates are based on process sewer flow of 3,893,000 gal for the week.) Tank was removed, cleaned out, and buried in the LLBG in September 1988.
	01-17-86	334-A Building	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	10 - 15 gal	Outlet hose on feed pump 2 came off during waste acid pumping operations resulting in acid spill.	Pump was stopped and hose reattached. Waste acids were cleaned up.	No discharges into the process sewer.
	02-25-86	334-A Building	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Small quantity	A discharge hose for the acid transfer pump 1 came loose from pump allowing the acid to spill into the pit near pump 1. Spill resulted from improper clamping of hose and an unauthorized modification.	Pump was secured and taken out of service until repairs were completed.	No discharges into the process sewer; the two feed pumps were replaced with one pump that is connected by PVC piping - no flexible hoses.
	07-28-86	334-A Building	Waste etch acids	HNO_3, HF, and H_2SO_4 acids containing copper, uranium, and zirconium in solution	Approximately 1 qt of acidic solution containing <1 lb of HNO_3 and <1/2 lb of HF acid	Small leak in the spent etch acid transfer system resulted in release of a small quantity of material.	Spilled material was discharged into the process sewer.	Quantity involved was insignificant compared with CERCLA RQs for HNO_3 (1,000 lb) and HF (100 lb). No attributable increase was seen in weekly process sewer composite sample, indicating that spill was insignificant compared to routine operational releases.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334-A Building (cont)	02-23-88	334-A Building	Waste etch acids	HNO_3 and HF acids containing copper, uranium, and zirconium in solution	About 1 qt	During maintenance activities, acid had been placed in a plastic jug that leaked allowing acid to spill onto the floor.	Spill was washed into the process sewer.	Very small quantity of acid - would not be a reportable amount.
313 Building	Week ending 06-15-81	Uranium recovery area	Neutralized waste	$NaNO_3$, Na_2SO_4, NaF, and $Na_2Cr_2O_7$ solution with precipitates of copper, uranium, and zirconium	Unknown	Process sewer analyses showed high nitrate (115 ppm) and high sulfate (100 ppm) values. No known spill discovered.	None.	Based on a normal NO_3- content of 24 ppm and a total process sewer flow of 30,000 gal for the week, ~31 lb of $NaNO_3$ could have been involved in this spill. There is no CERCLA RQ for $NaNO_3$.
	Week ending 08-17-81	Uranium recovery area	Neutralized waste	$NaNO_3$, Na_2SO_4, NaF, and $Na_2Cr_2O_7$ solution with precipitates of copper, uranium, and zirconium	Unknown	Leak around pump shaft seal at the waste acid neutralization tank resulted in discharge into the process sewer.	Leaking shaft seal was replaced after the summer outage. Solution was washed into the process sewer.	The weekly process sewer composite sample showed an elevated pH compared to normal (10.1 vs 8.0) and a much elevated F- level compared to normal (5.1 ppm vs 0.2 ppm). Based on a total weekly flow of 174,000 gal ~16 lb of NaF could have been involved in this discharge. This is well below the current CERCLA RQ limit of 1,000 lb of NaF.
	12-14-81	Uranium recovery area	Neutralized waste	$NaNO_3$, Na_2SO_4, NaF, and $Na_2Cr_2O_7$ solution with precipitates of copper, uranium, and zirconium	Approximately 500 gal of solution	Valve left open at neutralizing tank pH meter, allowing neutralized spent acid solution to discharge into the process sewer.	pH value was closed, stopping the release. Solution washed into the process sewer.	Weekly process sewer sample showed F- level of 11.4 ppm; NO_3- level of 592 ppm; pH of 9.62. Based on typical process sewer values for F-, the spill could have involved 41 lb of NaF. This value is well below the current CERCLA RQ for NaF of 1,000 lb.
	06-20-83	Uranium recovery area	Neutralized waste	NaF, $NaNO_3$, and Na_2SO_4, solution with precipitates of copper, chromium, uranium, and zirconium	Unknown (small quantity)	Leaking packing at neutralization tank pump resulted in release to the process sewer. Weekly 313 process sewer sample showed elevated levels of fluoride (6.3 ppm) and copper (2.2 ppm).	Pump packing was repaired. Solution washed into the process sewer.	Based on the normal average weekly composite sample F- content of 0.4 ppm, and the normal average copper content of 0.1 ppm, it is estimated that 28 lb of NaF and 4 lb of copper could have been involved in this release (254,000 gal total process sewer flow). The CERCLA RQ for NaF is 1,000 lb, well above the quantity estimated to have been released in this event.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
313 Building (cont)	11-03-83	Uranium recovery area	Waste etch acids	HNO_3, HF, and H_2SO_4 acid containing copper chromium, uranium, and zirconium in solution	Approximately 1 gal of solution	While disconnecting piping at a component cleaning line pump (P-1) for maintenance, solution leaked from pipe into process sewer.	No cleanup action. Bucket was placed under pipe to collect remaining acid solution.	Quantity was apparently well below any CERCLA RQs. A valve was installed to isolate the pump when maintenance was required.
	03-26-84	311 Tank Farm and uranium recovery area	Neutralized waste	NaF, $NaNO_3$, and Na_2SO_4, solution with precipitates of copper, chromium, uranium, and zirconium	Unknown	Weekly 313 process sewer sample for the week of 03-19-84 to 03-26-84 showed elevated level of fluoride (4.8 ppm). This was apparently due to three separate events: • A leak at the 313 recovery area neutralized pump • Washdown of 311 catch basin (including crystals from apparent previous spill) into the process sewer • Washdown of acid sump behind 303-F Building in preparation for repair work.	None.	Based on a normal average weekly process sewer sample F- content of 0.7 ppm and using a total stream flow of 311,100 gal, 23 lb of NaF could have been released in this spill. This is well below the CERCLA RQ for this compound of 1,000 lb.
	03-12-87	313 Building - recovery area	Waste etch acids	HNO_3, HF, and H_2SO_4 acid containing uranium, copper chromium, and zirconium in solution	3/4 gal	Acid sprayed out of air-actuated inline valve above tank 2. Approximately 1/4 gal of acid reached process sewer and activated pH monitor alarm. Remaining acid puddled on floor. Appeared that mechanical stops in valve were out of adjustment.	Spill kits were used to clean up floor and walls, which were scrubbed and washed down. Air valve was repaired, and pressure in system investigated.	--
	08-08-89	313 Building - recovery area	Radioactive contaminated water	--	270 gal	Valve of hot water hose leaked water into radioactively contaminated processing area. Leak filled sump under the process tanks and then containment overflowed into hallway at south end of building.	Water pumped from containment area for processing; mopped up outside containment. Valve was repaired. Contamination survey was performed.	--

Table 3-1. Known Spills During 300 Area Waste Acid Treatment System RCRA Operations*.

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
311 Tank Farm	07-19-82	311 Tank Farm	Neutralized waste	NaF, $NaNO_3$, $Na_2Cr_2O_7$, and Na_2SO_4, solution with precipitates of uranium, copper, and zirconium	Unknown (small quantity)	35 lb of oxalic acid were transferred into the outside storage tank, resulting in a chemical reaction that foamed out of the tank and into the process sewer system.	Remaining foam was washed into the process sewer.	Estimate: copper (56 lb), NO_3- (970 lb), fluoride (50 lb), uranium (0.3 lb). Estimated quantity of NaF involved (100 lb) was well below current CERCLA RQ of 1,000 lb.
	Week ending 02-13-83	311 Tank Farm	Neutralized waste	NaF, $NaNO_3$, $Na_2Cr_2O_7$, and Na_2SO_4, solution with precipitates of uranium, copper, and zirconium	Unknown	Overflow of storage tank in 311 Tank Farm. Weekly 313 process sewer sample showed elevated levels of fluoride (7 ppm) and nitrate (158 ppm). High-level alarm was out of adjustment.	Washed into the process sewer	This weekly process sewer composite normal average fluoride content was 0.3 ppm; the average NO_3 content was 11.4 ppm. Based upon a total flow of 313,000 gal, the quantity released in this event is estimated to have been 39 lb of NaF and 525 lb of $NaNO_3$. The CERCLA RQ for NaF is 1,000 lb; there is no RQ for $NaNO_3$. Repaired high-level alarm.
	08-24-87	311 Tank Farm - east pipe trench at railroad underpass	Waste etch acids	HNO_3, H_2SO_4, and HF acids containing uranium, copper, and zirconium in solution	Not reported	Acid leak found in trench that damaged two adjacent lines containing ethylene glycol. Leak was contained in trench and railroad underpass.	Pipes were flushed and soda ash was applied to neutralize acid.	Railroad underpass was pumped out and all liquids and solids in trench disposed. Piping was repaired. There was no discharge to the process sewer.
	08-08-89	311 Tank Farm - bermed containment area and sump	Waste etch acids	HNO_3, H_2SO_4, and HF acids containing uranium, copper, and zirconium in solution	Not reported	Leak in cemented joint of aging PVC pipe resulted in acidic pH in containment area and sump pump effluent.	205 gal of liquid was pumped from bermed containment area and neutralized in tank 2. Joint was replaced.	There was no discharge to the process sewer.
	12-05-89	311 Tank Farm - bermed containment area and sump	Caustic solution; weak etch acids	50% NaOH and HNO_3, H_2SO_4, and HF acids containing uranium, copper, and zirconium in solution	Small quantity	Small leak in joint of acid transfer line dripped onto the steel caustic transfer pipe connected to tank 2. The acid caused a caustic line underneath to begin leaking, resulting in a high pH in the sump water.	Leak was fully contained. Applicable valves and pumps were locked out and temporary repairs were ordered.	Collected solution and rinse water were added to 300 Area WATS in the 313 Building.

Table 3-1. Known Spills During 300 Area Waste Acid Treatment RCRA Operations.

HNO_3	= nitric acid.
H_2SO_4	= sulfuric acid.
CrO_3	= chromic acid.
HF	= hydrofluoric acid.
NO_3^-	= nitrate ion.
F^-	= fluoride ion.
NaOH	= sodium hydroxide.
ppm	= parts per million.
PVC	= polyvinyl chloride.
CERCLA	= Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
RQ	= reportable quantity.
$Cu(NO_3)_2$	= cupric nitrate.
$NaNO_3$	= sodium nitrate.
Na_2SO_4	= sodium sulfate.
NaF	= sodium fluoride.
$Na_2Cr_2O_7$	= sodium dichromate.
300 Area WATS	= Waste Acid Treatment System.

* For purposes of consistency with the records from which these data were derived, all quantities are entered in English units as originally recorded.

** This likely documents a direct discharge to the process sewer and not a spill.

Table 3-2. Description of Building 333 Chemical Process Tanks.

Tank number/ description	Process	Capacity (gal)	Example of solution qty. for 1 yr. (gal)	Chemical input	Primary chemical output	Example of output qty. for 1 yr. (lb)	When solution changed
2-Cold HNO_3 etch	Uranium-billet cleaning	105	1,113	HNO_3	$UO_2(NO_3)_2$ HNO_3	81 3,996	0.3 lb uranium/gal
4-Hot HNO_3 etch	Uranium-billet cleaning	105	2,449	HNO_3	$UO_2(NO_3)_2$ HNO_3	2,432 15,940	1 lb uranium/gal
5-Zircaloy-2 component etch	Cleaning of Zircaloy-2 rolled stock, clad shells, end caps, cast braze rings, and support hardware	473	6,518	HNO_3 HF	$Cr(NO_3)_3$ $Fe(NO_3)_3$ H_2ZrF_6 HF HNO3	12 28 3,583 1,141 20,812	0.3 lb zirconium/gal
7-Water rinse	Water rinse after cleaning in tank 11	105		None	NA	NA	
9-Copper/Cu-Si component etch	Copper and copper-silicon component cleaning	255	4,054	HNO_3 HF	$Cu(NO_3)_2$ $Mn(NO_3)_2$ SiO_2 HF HNO_3	1,602 24 64 2,202 16,194	1 lb copper/gal
10-Copper strip	Copper-silicon removal	578	33,697	HNO3	$Al(NO_3)_3$ $Cu(NO_3)_2$ $Fe(NO_3)_3$ $Mn(NO_3)_2$ $NaNO_3$ SiO_2 H_2ZrF_6 $UO_2(NO_3)_2$ HNO_3	174 132,254 74 1,007 414 3,253 191 614 82,558	When Cu-Si removal rate is too slow
11-Zinctone* copper brightener	Copper and copper-silicon component cleaning	105	210**	CrO_3 H_2SO_4 Na_2SO_4 HNO_3	$Cr_2(SO_4)_3$ $CuSO_4$ Na_2SO_4 HNO_3 H_2SO_4	151 161 272 36 132	Twice a year
13-Zircaloy-2 etch (for rework fuel)	Prebraze etch	360	1,526	HNO_3 HF	$Fe(NO_3)_3$ H_2ZrF_6 HF HNO_3	12 781 180 5,426	0.3-0.4 lb zirconium/gal

Table 3-2. Description of Building 333 Chemical Process Tanks.

Tank number/ description	Process	Capacity (gal)	Example of solution qty. for 1 yr. (gal)	Chemical input	Primary chemical output	Example of output qty. for 1 yr. (lb)	When solution changed
15-Zircaloy-2 etch	Prebraze etch; bell jar cleaning	473	20,557	HNO_3 HF	$Cr(NO_3)_3$ $Cu(NO_3)_2$ $Fe(NO_3)_3$ $Ni(NO_3)_2$ SiO_2 H_2ZrF_6 HF HNO_3	69 25 147 20 21 13,777 3,104 69,234	0.3-0.4 lb zirconium/gal
16***-Uranium etch	Prebraze etch; bell jar cleaning	177	2,814	HNO_3 $Al(NO_3)_3$	$Al(NO_3)_3$ $Fe(NO_3)_3$ $UO_2(NO_3)_2$ HNO_3	352 13 262 17,955	0.7 lb uranium/gal
19-Zircaloy-2 etch	Preweld etch, braze ring cleaning (optional)	473	13,727	HNO_3 HF	$Al(O_3)$ $Cr(NO_3)_3$ $Fe(NO_3)_3$ $Ni(NO_3)_2$ SiO_2 H_2ZrF_6 $Be(NO_3)_2$ HF HNO3	50 26 130 14 19 9,045 24 2,183 46,727	0.3-0.4 lb zirconium/gal
25***-Static water rinse	Copper strip and chemical milling rinse	140	11,130	None	$Cu(NO_3)_2$ H_2SO_4 $UO_2(NO_3)_2$ HNO_3	1,151 1,233 462 962	One or two times per week
26-Final etch	Final bright etch	473	11,532	HNO_3 HF	$Cr(NO_3)_3$ $Fe(NO_3)_3$ $Ni(NO_3)_2$ SiO_2 $Be(NO_3)_2$ HF HNO_3 H_2ZrF_6	49 14 15 17 31 1,903 31,078 7,573	0.3-0.4 lb zirconium/gal
31-Spare HNO_3 tank	Decontamination of fuels	208	Minimal - tank is used infrequently.				

Table 3-2. Description of Building 333 Chemical Process Tanks.

Tank number/ description	Process	Capacity (gal)	Example of solution qty. for 1 yr. (gal)	Chemical input	Primary chemical output	Example of output qty. for 1 yr. (lb)	When solution changed
32***-Chemical milling	Chemical milling	907	27,881	HNO_3 H_2SO_4	$Cr(NO_3)_3$ $Cu(NO_3)_2$ $Fe(NO_3)_3$ $UO_2(NO_3)_2$ HNO_3 H_2SO_4	27 41 303 26,540 30,318 128,415	1 lb uranium/gal

HNO_3 = nitric acid.
$UO_2(NO_3)_2$ = uranyl nitrate.
HF = hydrofluoric acid.
$Cr(NO_3)_3$ = chromic nitrate.
$Fe(NO_3)_3$ = ferric nitrate.
H_2ZrF_6 = hydrogen hexafluorozirconate.
$Cu(NO_3)_2$ = cupric nitrate.
$Mn(NO_3)_2$ = manganese nitrate.
SiO_2 = silicon dioxide.
$Al(NO_3)_3$ = aluminum nitrate.
$NaNO_3$ = sodium nitrate.
CrO_3 = chromic acid.
H_2SO_4 = sulfuric acid.
Na_2S0_4 = sodium sulphate.
$Cr_2(SO_4)_3$ = chromic sulfate.
$CuSO_4$ = cupric sulfate.
$Ni(NO_3)_2$ = nickel nitrate.
Al_2O_3 = aluminum oxide.
$Be(NO_3)_2$ = beryllium nitrate.

Note: For purposes of consistency with the records from which these data were derived, all quantities are entered in English units as originally recorded
* Zinctone = 0.37 lb/gal chromium trioxide, 1.63 lb/gal sulfuric acid, and 0.17 lb/gal nitric acid.
** Before reducing CR+6 to Cr+3 in tanks 7 and 11.
*** This tank discharged to the uranium-bearing system.

Table 3-3. 300 Area Waste Acid Treatment System Sludge Transferred to the Low-Level Burial Grounds.*

Year	Total pounds	Number of drums	Pounds of material				
			Uranium	Chromium	Copper	Fluoride ion	Nitrate ion
1985	44,912	198	97	13	9,857	3,029	3,100
1986	298,720	633	775	104	32,346	22543	33,275
1987	46,977	98	178	3	4,801	2,050	5,525
1988	534	2	1	14	70	3	3
1989	3,620	7	31	3	533	35	232
Total	394,763	938	1,082	137	47,607	27,660	42,135

*Sludge from centrifuge. Sulfate ion shown on Tables 3-4 and 3-5 but not on this table was from the uranium recovery system waste that was not processed through the centrifuge.

Conversion: pounds to kilograms = multiply pounds by 0.45.

Table 3-4. 300 Area Waste Acid Treatment System (RCRA) Slurry Transferred to 183-H Basins 1980 to 1985.

Year	Total gallons[b]	Number of loads	Pounds[a] of material							
			Uranium	Chromium	Manganese	Copper	Fluoride ion	Nitrate ion	Sulfate ion	Ammonium ion
1980	151,000	60	410	200	300	33,200	10,800	151,800	59,900	130
1981	200,000	75	520	150	340	38,200	12,700	252,700	50,800	260
1982	247,000	112	470	130	420	44,600	17,700	309,400	58,000	290
1983	406,000	184	630	120	380	72,600	22,700	451,300	122,300	760
1984	416,000	185	600	90	300	57,000	32,700	431,700	141,200	660
1985	369,000	163	440	90	200	49,000	27,000	550,000	97,000	520
Total	1,789,000*	779	3,070	780	1,940	294,600	123,600	2,146,900	529,200	2,620

*Weighted average pH was 9.8.

Conversion:
- pounds to kilograms = multiply pounds by 0.45.
- gallons to liters = multiply gallons by 3.79.

Table 3-5. 300 Area Waste Acid Treatment System Effluent Transferred to the 340-B Building and Offsite.

Year	Total pounds	Number of drums	Pounds of material					
			Uranium	Chromium	Copper	Fluoride ion	Nitrate ion	Sulfate ion
A: Transferred to the 340-B Building								
1985	46,250	20	1	1	2	7,013	39,677	17,001
1986	327,588	125	10	15	10	5,742	300,035	92,185
1987	51,165	19	2	1	1	628	33,060	9,038
1988	5,500	3	1	1	<1	99	2,904	110
1995	31,545	NA	<1	<1	<1	95	449	1,214
Total	462,048[a]	167	14	18	13	13,577	376,128	119,548
B: Shipped offsite								
1989	11,414[b]	3	2	2	<1	317	9,039	468

[a]Weighted average pH was 13.18.
[b]Weighted average pH was 12.63.

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
1-80	02/01/80	Used sulfuric acid from startup tests of acid digestion system		935	230 g/L	sulfuric acid
					30 ppm	barium
					30 ppm	chromium
					300 ppm	copper
					30 ppm	manganese
					5 ppm	molybdenum
					3,000 ppm	sodium
					60 ppm	nickel
					1 ppm	vanadium
					300 ppm	zinc
					500 ppm	aluminum
					300 ppm	calcium
					300 ppm	iron
4-80	10/02/80	Used glycol/sodium metasilicate-based proprietary silk screen cleaning soluiton	100		pH = 12.1	
					90-100 ppm	barium
					10 ppm	cadmium
					30 ppm	copper
					500-1,100 ppm	potassium
					16,000-21,000 ppm	sodium
					40-60 ppm	lead
					40 ppm	zinc
					5-10 ppm	boron
1-81	02/12/81	Used copper strip solution containing depleted uranium	300		2.63 lb/gal	nitric acid
					1.46 lb/gal	copper
					0.022 lb/gal	uranium
					30 ppm	chromium
					6 ppm	manganese
					10 ppm	nickel
					40 ppm	zinc
					200 ppm	aluminum
					150 ppm	calcium
3-81	12/03/81	Unused chemicals:				
		Nickel acetate solution	0.25		pH = 3.24	
					13 ppm	arsenic
					1 ppm	zinc
					1 ppm	nickel
					20 ppm	aluminum
		Proprietary chemical 1	1.5		pH = 7.79	
					90 ppm	chromium,
					570 ppm	sodium
					1 ppm	antimony
		Proprietary chemical 2	0.75		pH = 7.45	
					350 ppm	sodium
		Nickel sulfate solution	1		pH = 5.34	
					1,530 ppm	nickel

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
					1 ppm	arsenic
3-81 (cont)					1 ppm	cobalt
					1 ppm	chromium
		Proprietary chemical 3	0.75		pH = 8.43	
					25 ppm	cobalt
					150 ppm	sodium
		Proprietary chemical 4	0.75		pH = 8.92	
					80 ppm	chromium
					1 ppm	antimony
					360 ppm	sodium
1-82	01/05/82	Used copper strip solution containing depleted uranium	300		<0.1 lb/gal	nitric acid
					1.31 lb/gal	copper
					0.152 lb/gal	uranium
					6 ppm	cobalt
					28 ppm	nickel
					100 ppm	zinc
					20 ppm	titanium
2-82	01/05/82	Used glycol/sodium metasilicate-based proprietary silk screen cleaner	50		pH = 11.78	
					28 ppm	barium
					140 ppm	copper
					4,100 ppm	sodium
					26 ppm	lead
					3 ppm	zinc
					1 ppm	chromium
					5 ppm	titanium
					12 ppm	phosphorus
3-82	07/09/82	Unused chemicals:				
		Oxalic acid		35	None	
		Proprietary chemical	55		pH = 13.7	
					18 ppm	copper
					3,800 ppm	silicon
					13 ppm	zinc
		Solution in unmarked container	5		pH = 13.3	
					6 ppm	copper
4-82	11/05/82	Used nitric acid solution containing uranium	13		0.32 lb/gal	nitric acid
					607 ppm	uranium
1-83	01/17/83	Used absorbing solution containing mercuric chloride (100 g/L = 9.8 lb)	12		None	
2-83	04/22/83	Used glycol/sodium metasilicate-based proprietary silk screen cleaning solution (two drums):				
		Drum 1	30		pH = 10.7	
					2 ppm	barium

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
					630 ppm	sodium
2-83 (cont)		Drum 2	30		pH = 12.8	
					20 ppm	barium
					2 ppm	molybdenum
					1,400 ppm	sodium
					260 ppm	lead
					2 ppm	strontium
3-83	04/25/83	Used copper strip solution containing depleted uranium	400		1.07 lb/gal	nitric acid
					1.52 lb/gal	copper
					0.816 lb/gal	uranium
					280 ppm	zinc
					790 ppm	titanium
					30 ppm	nickel
					170 ppm	iron
					470 ppm	calcium
4-83	07/11/83	Used copper strip solution containing depleted uranium	550		3.0 lb/gal	nitric acid
					1.5 lb/gal	copper
					0.3 lb/gal	uranium
					324 ppm	zinc
					30 ppm	nickel
					270 ppm	titanium
					98 ppm	lead
					1,178 ppm	magnesium
					230 ppm	calcium
1-84	04/18/84	Used glycol/sodium metasilicate-based proprietary silk screen cleaning solution (three drums):				
		Drum 1	30		pH = 12.9	
					45 ppm	barium
					12 ppm	chromium
					10,900 ppm	sodium
					110 ppm	lead
					2,200 ppm	silicon
					2.7 ppm	strontium
		Drum 2	30		pH = 11.9	
					1.1 ppm	chromium
					670 ppm	sodium
					370 ppm	phosphorus
					340 ppm	silicon
					1,160 ppm	potassium
		Drum 3	30		pH = 12.2	
					42 ppm	barium
					6 ppm	chromium
					1 ppm	copper
					10,600 ppm	sodium
					50 ppm	lead
					1 ppm	strontium

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
					2,480 ppm	silicon
1-84 (cont)					2 ppm	zinc
					20 ppm	phosphorus
2-84	05/03/84	Used copper strip solution containing depleted uranium	225		0.19 lb/gal	nitric acid
					1.80 lb/gal	copper
					0.44 lb/gal	uranium
					336 ppm	lead
					588 ppm	zinc
					212 ppm	titanium
					374 ppm	chromium
					3,820 ppm	gadolinium
					1,120 ppm	phosphorus
1-85	04/12/85	used copper strip solution containing depleted uranium	200		0.07 lb/gal	nitric acid
					1.60 lb/gal	copper
					0.394 lb/gal	uranium
					1,400 ppm	aluminum
					60 ppm	cobalt
					1,600 ppm	sodium
					2,000 ppm	magnesium
					600 ppm	phosphorus
					700 ppm	silicon
					300 ppm	zinc
					150 ppm	titanium
2-85	05/10/85	Used phosphoric/citric-acid-based proprietary cleaning solution	80		pH = 1.0	
					0.38 lb/gal	phosphoric acid
					1,400 ppm	citrate
					30 ppm	sodium
3-85	05/21/85	Residual 36% sulfuric acid in 20 drums	Unknown (residue in 'empty' drums)		None	
4-85	10/16/85	Used copper strip solution containing depleted uranium	200		0.032 lb/gal	nitric acid
					1.19 lb/gal	copper
					0.249 lb/gal	uranium
					1,200 ppm	magnesium
					90 ppm	titanium
1-86	01/09/86	Uranium-bearing nitric acid solution from the 325 Building used in chop leach testing	8.4		1.74 lb/gal	nitric acid
					0.91 lb/gal	uranium
					80 ppm	aluminum
					40 ppm	iron
2-86	08/15/86	Used copper strip solution containing depleted uranium	250		0.097 lb/gal	nitric acid
					1.8 lb/gal	copper
					0.31 lb/gal	uranium

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	Quantity (pounds)	Summary of lab results	
1-87	04/18/87	Used copper strip solution containing depleted uranium	200		0.033 lb/gal	nitric acid
1-87 (cont)					1.68 lb/gal	copper
					0.28 lb/gal	uranium
					230 ppm	titanium
2-87	05/06/87	Nitric acid solution from analyzing weir box sludge	31		4.00 lb/gal	nitric acid
					1.22 lb	uranium
					0.11 lb	copper
					0.12 lb	magnesium
					0.09 lb	manganese
					0.08 lb	nickel
					0.30 lb	aluminum
					1.01 lb	calcium
					0.68 lb	iron
3-87	10/06/87	Solutions in Tank 15 and 19 that had been used for testing zirconium removal and hydrofluoric acid rejuvenation	110		None	
1-88	02/26/88	Used copper strip solutions containing depleted uranium	150		0.021 lb/gal	nitric acid
					1.69 lb/gal	copper
					0.293 lb/gal	uranium
					100 ppm	titanium
					20 ppm	iron
N/A	01/75 to 11/86	Solutions from decontaminating autoclaves after a fuel element failure:				
		Decon solution makeup:	1,440			
		Sodium hydroxide		1,248		
		Potassium permanganate		208		
		Final cleaner makeup:	1,350			
		Ammonium citrate dibasic		195		
		Ethylenediaminetraacetic acid		12		
N/A	01/75 to 01/86	X-ray film chemicals:			None	
		Developer chemicals:	2,336			
		Sodium sulfite		2,797		
		Hydroquinone		934		
		Potassium/sodium hydroxide		374		
		Sodium carbonate		374		
		Diethylene glycol		374		
		Acetic acid		449		
		1-phenyl-3-pyrazolidone		66		
		Glutaraldehyde		772		
		Fixer chemicals:	6,811			
		Ammonium thiosulfate		9,184		
		Sodium bisulfite		576		
		Acetic acid		751		

Table 3-6. Nonroutine Waste Managed in the 300 Area Waste Acid Treatment System.

Waste disposal permit number	Permit date	Material description	Quantity (gallons)	(pounds)	Summary of lab results	
		Aluminum sulfate		250		
		Gluconic acid		250		
		System cleaners:	3,438			
		Sodium dichromate		139		
		Sulfuric acid		139		
		Roller cleaner:	1,017			
		Sulfamic acid		67		
		Potassium dichromate		40		

g/L = grams per liter.
lb = pound.
lb/gal = pounds per gallon.
ppm = parts per million.

Conversion:
- pounds to kilograms = multiply pounds by 0.45.
- gallons to liters = multiply gallons by 3.79.
- pounds/gallon to grams per liter = multiply pounds/gallon by 119.82.

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TABLE

4.0 WASTE CHARACTERISTICS

This chapter discusses the inventory and the characteristics of the waste treated and stored in the 300 Area WATS tank system.

4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE

From the beginning of 300 Area WATS RCRA operations (November 19, 1980) until November 1985, the waste stream consisted of a waste acid slurry that was transported by tanker trailer to the 183-H Basins for volume reduction through solar evaporation (Chapter 3.0, Table 3-4). In November 1985, the slurry began being separated into solids (sludge) and effluent. The sludge was containerized and transported to the LLBG for disposal (Chapter 3.0, Table 3-3). The effluent was transferred to the 340-B Building for temporary tank storage until transferred to the DST System, or if below radioactive release limits to an offsite TSD facility (Chapter 3.0, Table 3-5). The unit also managed nonroutine waste acid (Section 3.0, Table 3-6).

The estimated maximum inventory of waste acid treated in the 300 Area WATS from 1980 through 1989, when the unit essentially ceased processing fuel fabrication waste and nonroutine waste, is 1,786,907 kilograms. This was determined by summing the quantities presented in Chapter 3.0, Tables 3-3, 3-4, and 3-5 of sludge, slurry, and effluent collected from the system for disposal or long-term storage. The maximum quantity of waste treated during any 1 year was 1,576,646 liters (Chapter 3.0, Table 3-4).

4.2 WASTE CHARACTERISTICS

The 300 Area WATS routinely managed waste originating from fuel fabrication process tanks located in the 333 Building. The chemical and radioactive constituents from each of these tanks are shown in the primary chemical output column and in the footnotes of Chapter 3.0, Table 3-2. Although waste designation was not performed on this waste before disposal to the system, on entry into the system some waste would have exhibited dangerous waste characteristics of ignitability (D001), corrosivity (D002), and Washington State toxicity (WT02), and toxicity due to chromium (D007). No 'listed' waste (in accordance with WAC 173-303-081 and WAC 173-303-082) existed or was managed in any portion of the 300 Area WATS during RCRA operations.

Until 1988, the 300 Area WATS also treated corrosive dangerous or mixed waste from other locations in the 300 Area and from onsite on a nonroutine basis (Table 3-6). Although waste designation was not performed on this waste before entry to the system, some waste would have exhibited dangerous waste characteristics of ignitability (D001), corrosivity (D002), and EP toxicity (now TCLP) due to arsenic (D004), barium (D005), cadmium (D006), and lead (D008).

The neutralized effluent stored in tanks 40 and 50 could have remained corrosive (D002) dangerous waste because of the over addition of NaOH during waste acid neutralization. In the past, such waste also might have retained its toxicity characteristics from the heavy metals. However, waste designation, based on sampling of the process effluent, indicated that, although remaining radioactive, the waste was nondangerous.

Table 4-1 presents the known chemical constituents from 333 Building operations and from nonroutine chemical additions managed in the 300 Area WATS. Most of these constituents were not added to the system in significant quantities or above dangerous waste designation levels.

Table 4-1. Chemical Waste Constituents Managed in the 300 Area WATS.

Metals	Organic Materials
Aluminum	Acetate ion
Antimony	Citrate ion
Arsenic	Choline chloride
Barium	Deoxycholic acid
Beryllium	Diethanolamine
Boron	Diethylene glycol
Cadmium	Ethylenediamine
Calcium	Ethylenediamine-Tetraacetic acid
Cerium	Gluconic acid
Chromium	Glutaraldehyde
Cobalt	Hydroquinone
Copper	Mercaptoacetic acid
Gadolinium	Oxalate ion
Iron	1-phenyl-3-pyra zolidone
Lead	Rhodamine-B
Lithium	Trichloroacetic acid
Magnesium	Urea
Manganese	
Mercury	
Molybdenum	
Nickel	
Phosphorus	
Potassium	
Silicon	
Silver	
Sodium	
Strontium	
Titanium	
Uranium	
Vanadium	
Zinc	
Zirconium	

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FIGURE

5.0 GROUNDWATER

A groundwater monitoring program in accordance with WAC 173-303-645 was not required during operations. The 300 Area WATS was not a regulated unit under the definitions of WAC 173-303-040 (i.e., surface impoundment, waste pile, land treatment unit, landfill) that would require such monitoring.

In accordance with the Tri-Party Agreement (Ecology et al. 1999), all groundwater in the contiguous 300 Area has been included in the 300-FF-5 (groundwater) OU. This OU includes groundwater beneath the 300 Area WATS. The 300-FF-5 OU consists of the aquifers beneath the 300-FF-1 OU and the contiguous 300 Area portion of the 300-FF-2 OU. This OU is bounded by the Columbia River on the east (Figure 5-1). The 300-FF-5 OU is defined by the "observed and assumed extent of uranium contamination in the groundwater" and includes all contamination exceeding applicable or relevant and appropriate requirements emanating from the two OUs, and detected in ground and sediment below the water table (DOE/RL-89-14).

This groundwater has been investigated under the 300-FF-5 CERCLA OU RI/FS process. In accordance with the Tri-Party Agreement, this groundwater would have been cleaned up under the 300-FF-2 OU remedial action process, if necessary. However, in accordance with the ROD for the 300-FF-1 [source] and the 300-FF-5 [groundwater] OUs (DOE/RL, et al, 1996), 300 Area groundwater will not be remediated. Consequently, groundwater remediation is not a requirement of 300 Area WATS closure.

Monitoring of groundwater beneath the 300 Area WATS during 300 Area WATS closure, while awaiting CERCLA cleanup of 300 Area WATS soil or after soil cleanup, will not be required. The few and minor 300 Area WATS releases to soil have not impacted groundwater. The 300-FF-1 and 300-FF-5 ROD identifies that within the contiguous 300 Area, only the groundwater beneath the land-based disposal units (i.e., Process Trenches and Process Ponds of the 300-FF-1 OU) is contaminated above health-based levels. This groundwater will continue to be monitored for dangerous contaminants 1,2-Dichloroethene and trichloroethene, neither of which were managed at the 300 Area WATS. While awaiting CERCLA soil cleanup, 300 Area WATS soil contamination locations (Chapter 3.0) will remain capped by the concrete structures currently in place, which will ensure that soil contaminants remain immobilized and present no threat to groundwater during this interim period. Because groundwater protection is a remedial action objective of CERCLA soil disposition, any contaminants remaining in 300 Area WATS soil after soil disposition will have been determined to not present a threat to groundwater.

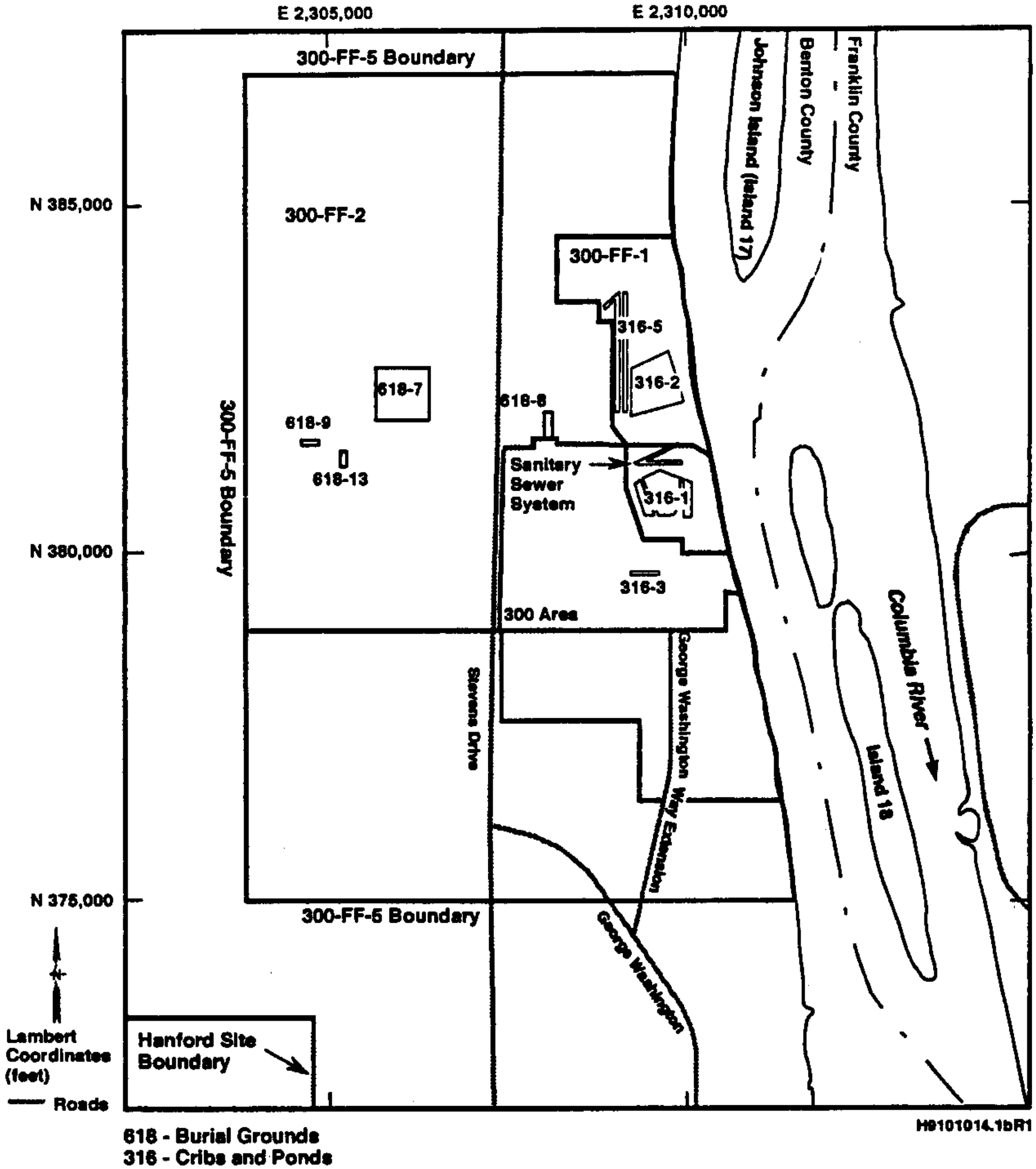

Figure 5-1. 300-FF-5 Operable Unit.

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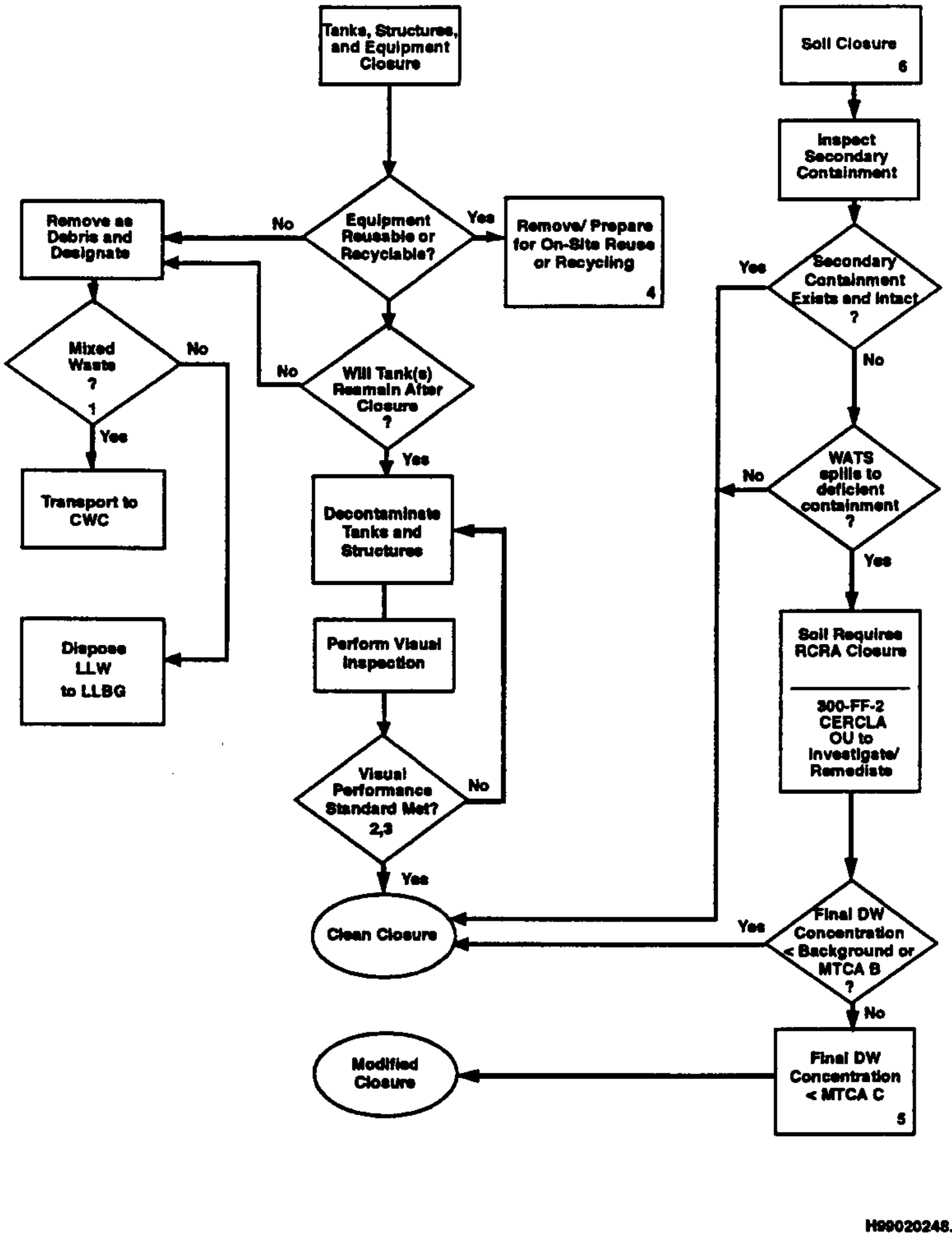

Figure 6-1. Closure Strategy Flowchart for the 300 Area Waste Acid Treatment System. (sheet 1 of 2)

Notes:

[1]Assumption: Most waste will contain both dangerous and radioactive components.

[2]The clean closure performance standard for these materials is 'clean debris surface' (Section 6.2.2).

[3]Assumption: Additional documentation will be possible and desirable where performance standards initially are not met.

[4]Must be radiologically releasable for recycling.

[5]Assumption: 300-FF-2 CERCLA OU cleanup levels will be required, at a minimum, to meet MTCA C industrial cleanup standards and closure as landfill will not be considered.

[6]Soil closure is with regard to contamination from RCRA 300 WATS operations.

Background	= Hanford Sitewide background threshold (upper limit range of concentrations) for soil (DOE-RL 92-24).
CERCLA	= Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
CWC	= Central Waste Complex.
LLBG	= Low-Level Burial Grounds.
LLW	= low-level waste.
MTCA	= Model Toxics Control Act (WAC 173-304) residential and industrial formulas.
MW	= mixed waste.
RCRA	= Resource Conservation and Recovery Act of 1976.

Figure 6-1. Closure Strategy Flowchart for the 300 Area Waste Acid Treatment System. (sheet 2 of 2)

Table 6-1. Soil Cleanup Levels for Potential Constituents.

Constituent	CAS #	Background[c] mg/kg (ppm)	Method A cleanup level[a] mg/kg (ppm)	Method B cleanup levels[e] mg/kg (ppm)		Method C cleanup levels[f] mg/kg (ppm)	
				Carcinogenicity	Toxicity	Carcinogenicity	Toxicity
Metals							
Barium	7440-39-3	175.0	[b]	[h]	5.6+3	[h]	2.45+5
Beryllium	7440-41-7	1.8	[b]	2.33-1	4.0+2	3.05+1	1.75+4
Chromium	16065-83-1	28.0	100.0	[h]	8.0+4	[h]	3.5+6
Copper	7440-50-8	30.0	[b]	[h]	2.96+3	[h]	1.3+5
Lead	7439-92-1	14.9	250.0	[g]	[g]	[g]	[g]
Mercury	7439-97-6	1.3	1.0	[h]	2.4+1	[h]	1.05+3
Nickel	7440-02-0	25.0	[b]	[h]	1.6+3	[h]	7.0+4
Vanadium	7440-62-2	107.0	[b]	[h]	5.6+2	[h]	2.45+4
Zinc	7440-66-6	79.0	[b]	[h]	2.4+4	[h]	1.05+6
Anions							
Nitrate	14797-55-8	208.0	[b]	[h]	1.2+5	[h]	5.6+6
Nitrite	14797-55-0	[d]	[b]	[h]	8.0+3	[h]	3.5+5

Notes:

[a] Method A cleanup levels from MTCA, WAC 173-340-740, Table 2, Method A Cleanup Levels -- Soil.
[b] No Method A cleanup level for this constituent.
[c] 95/95 reference threshold value from DOE/RL 92-24.
[d] Not calculated in Hanford Site background document (DOE/RL 92-24).
[e] Method B cleanup levels from formulas in MTCA, WAC 173-340-740, as shown in the CLARC II Database (Ecology 94-145).
[f] Method C cleanup levels from formulas in MTCA, WAC 173-340-745, Soil Cleanup Standards for Industrial Sites, as shown in the CLARC II Database (Ecology 94-145).
[g] Insufficient toxicity (reference dose) information or carcinogenicity information is available from the EPA to calculate a health-based cleanup level.
[h] Not classified as a carcinogen or insufficient EPA carcinogenicity information available (EPA 1994).

CAS # = Chemical Abstract Service number.
mg/kg = milligrams per kilogram.
ppm = parts per million.

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7.0 CLOSURE ACTIVITIES

This chapter discusses the activities necessary to implement the 300 Area WATS partial clean closure described in Chapter 6.0.

7.1 INTRODUCTION

The first step of 300 Area WATS closure will be partial clean closure. This step will be completed under this closure plan and will be achieved by clean closing aboveground structures and components in three Ecology-approved phases (Phases 1, 2 and 3). The decontamination and verification activities for these closure phases are in accordance with Ecology-approved phase-specific decontamination and inspection plans (DIP). Phase 1 activities for closure of the 313 Building (aboveground) were completed in accordance with the Phase 1 DIP (WHC-SD-ENV-AP-001, Rev. 0) in September of 1997. Phase 2 activities for closure of the 334-A Building, the 333 Building, and the 303-F Building were completed in accordance with the Phase 2 DIP (HNF-1784, Rev. 1) in September of 1998. Ecology has concurred with Phase 1 and 2 closure activities (Appendix 6A).

Phase 3 closure activities currently are underway in accordance with the Ecology-approved Phase 3 DIP (HNF-2814, Revision 0). Phase 3 closure of 300 Area WATS portions of the 334 and 311 Tank Farms will complete closure of the 333 and 303-F Buildings by removing piping from the buildings, and will remove piping from the WATS and U-Bearing Piping Trench. Phase 3 activities are scheduled to be complete in September 1999. Decontamination, verification, and Ecology concurrence for Phase 3 closure will be added to Appendix 6A.

The activities in support of partial closure are as follows:

- Remove dangerous waste inventory
- Remove tank system components and equipment
- Decontaminate 300 Area WATS structures and components that will remain after closure to visually verifiable 'clean debris surface' clean closure standard
- Visually inspect decontaminated surfaces for a clean debris surface
- Inspect secondary containment to identify any cracks that could have provided a pathway to soil for 300 Area WATS contaminants
- Certify partial closure activities.

7.2 REMOVAL OF WASTE INVENTORY

The last remaining system effluent was removed from tank 50 of the 300 Area WATS on July 25, 1995 (Chapter 3.0, Table 3-5) in a manner consistent with previous waste removals described in Chapter 3.0. The effluent was pumped to a tank trailer and transported to the 340-B Building for transfer to the DST System.

7.2.1 Field Documentation

Personnel conducting decontamination and inspections will maintain an official logbook. The field logbook will be bound and have consecutively numbered pages. All information pertinent to the activities will be recorded in the logbook in a legible fashion. The field logbook will be reviewed and signed by the person in charge on days when work is performed. If changes are necessary, the changes will be indicated by a single line drawn through the affected text. Modifications will be recorded in the field logbook along with circumstances requiring the action. Modifications to closure activities identified in the approved DIP were discussed with Ecology, approved by way of Project Manager Meetings, and performed. The individual responsible for the change will initial and date the entry. Each day's activities must be signed or initialed. The logbook should be protected, stored in a safe file or other repository, and kept as a permanent record. Copies of the field logbook will be made available to Ecology upon request.

7.2.2 Waste Designation and Disposal

Designation of closure waste and debris will meet the requirements of WAC 173-303. The land disposal restriction (LDR) notification and certification requirements of WAC 173-303-140 and all applicable requirements will be met. Designation of waste generated during phased-clean closure activities has been based on sampling and process knowledge described in the phase-specific DIPs and follows the logic identified in Figure 7-1.

Closure waste and debris will be accumulated in satellite accumulation areas at appropriate locations at the unit in accordance with WAC 173-303-200 while awaiting designation and transfer to a storage or disposal unit. Containers used for transfer of regulated materials will be U.S. Department of Transportation-approved containers compatible with the waste. The containers will be labeled and appropriate waste acceptance documentation completed for the receiving unit. After designation, waste will be managed as follows.

- Low-level waste will be disposed onsite in the LLBG.

- Mixed waste will be transferred to the Central Waste Complex for storage to await further treatment before final disposal.

- Dangerous waste, if any, would be transported offsite.

- Nondangerous and nonradioactive waste could be disposed through contracts with the city of Richland.

7.3 PHASE 1 CLOSURE ACTIVITIES - 313 BUILDING

Phase 1 closure included activities necessary to clean close 300 Area WATS portions of the uranium recovery room, which was the only 300 Area WATS operational area of the 313 Building. Phase 1 closure was completed in September 1997 in accordance with Ecology approved DIP (WHC-SD-ENV-AP-001, Rev. 0) and Ecology has concurred with the activities (Appendix 6A).

7.3.1 Equipment Removal

The 300 Area WATS tanks, components, and equipment of the 313 Building included pumps 2, 7, 8, and 9; metal transfer piping in the room; tanks 2, 5, 9, 10, and 11; and centrifuge, filter press, and metal support structures. These materials were removed as debris, designated as low-level waste, and disposed at the LLBG.

7.3.2 Decontamination of Concrete and Metal Surfaces

Equipment support structures, a portion of one concrete block building wall, the concrete floor, and metal drainage trench liner surfaces were decontaminated to meet the 'clean debris surface' clean closure standard (Figure 7-2).

The concrete bermed areas of the uranium recovery room floor were decontaminated to a 'clean debris surface' by scabbling off 0.6 centimeter of the contaminated surface layer. The lower 15 centimeters of the walls of the bermed areas and an area of the west wall near tank 2 also were scabbled. The scabbled wall area was approximately 1.2 meters wide starting at the floor and extending upward to the height of the block wall (approximately 2.4 meters). Scabbling occurred in a high-efficiency particulate air (HEPA)-filtered 'greenhouse' enclosure to prevent the escape of contamination. Scabbling residues were vacuumed into containers as generated using a HEPA-filtered vacuum system attached to the scabbler. Acid brick that capped the berm around bermed area 1 and that lies below floor coatings in bermed areas 1 and 3 could not be decontaminated. The acid brick was removed mechanically to the original concrete surface, and because the acid brick is integral to this surface, its removal constituted removal of the 0.6-centimeter surface for these areas. The scabbling and clean debris surface inspection of the acid brick removal area and the scabbled concrete floor were documented using a location-specific waste and residue removal verification (WRRV), similar to Figure 7-3 (refer to Appendix 6A-14). Scabbling and acid brick removal debris were collected, designated as low-level waste based on the results of waste designation sampling, and disposed at LLBG.

The exposed surfaces of the stainless steel liners for the two drainage trenches were decontaminated to a 'clean debris surface' by hand brushing and scrubbing using a detergent-water solution, and damp wiping. The decontamination and final visual acceptance are documented on a WRRV (refer to Appendix 6A-15). Decontamination waste (rags, etc.) was collected, designated as low-level waste, and disposed at LLBG.

The cast iron gratings over the drainage trenches were removed for disposal, designated as low-level waste, and disposed at LLBG.

7.4 PHASE 2 CLOSURE ACTIVITIES

Phase 2 closure provided for clean closure of all 300 Area WATS portions of the 334-A Building, and for some, but not all, 300 Area WATS portions of the 333 Building and the 303-F Buildings. Phase 2 closure was completed in September 1998 in accordance with Ecology-approved DIP (HNF-1784-1) and Ecology has concurred with the activities (Appendix 6A).

7.4.1 333 Building

Closure of the 333 Building addressed removal of metal tanks 7 and 11 and decontamination and inspection of the concrete floor beneath Tank 11. These matrixes existed in one small area of the 333 Building (Figure 7-4). The 300 Area WATS drain piping routed to the 334-A Building storage tanks is located in the concrete piping trenches and will be removed as a portion of Phase 3 closure.

Tanks 7 and 11 underwent radiation survey and were not radioactive above the release limits. These tanks were hand washed to remove visible waste residues and were removed for processing as recyclable scrap metal to gain access to the concrete floor for decontamination. Under the scrap metal exclusions of WAC 173-303-120 (2)(a)(iv), recyclable scrap metal is not subject to the dangerous waste designation requirement. Decontaminated scrap metal was inspected randomly to ensure residue removal. The decontaminated tanks were stored at a nearby laydown area for retrieval by the recycler. Decontamination solutions, rags, etc., were collected, designated, based on the results of tank residue sampling, and disposed as nonregulated.

A portion of the concrete floor of the 333 Building (Figure 7-3) was scabbled as described in Section 7.7.1 to achieve a 'clean' debris surface. The decontamination and visual verification are documented on a WRRV (refer to Appendix 6A-7).

7.4.2 334-A Building

Closure of 300 Area WATS portions of the 334-A Building addressed metal tank A and miscellaneous metal surfaces (e.g., metal tank supports, pit access ladder), plastic tanks B and C, PVC waste acid transfer piping in the building, and the concrete tank pit floor and lower 0.6 meter of the walls.

The PVC drain piping in the 334-A Building was disconnected from the tanks, surveyed for radioactivity, designated as low-level waste, and disposed at LLBG.

Metal tank A will remain after closure. Because tank A was cleaned and the plastic liner removed when the tank was taken out of service in 1988, no visible waste residues from operations existed in this tank at the time of Phase 2 closure activities. However, the tank had been open since 1988 and contained minor amounts of uncontaminated soil from foot traffic on the overhead grating. The tank was vacuumed and scrubbed by hand. Metal tank supports and the pit access ladder were hand scrubbed to a 'clean debris surface' as described in Section 7.3.2. Decontamination and visual acceptance were documented on a WRRV (refer to Appendix 6A-4). Decontamination solutions, rags, etc., were collected, designated as low-level waste, and disposed at LLBG.

Polyethylene plastic tanks B and C were removed during closure because not all tank and tank support surfaces were accessible for decontamination. The tanks were dismantled in sections to facilitate removal through the hatch in the overhead grating. Work started from the top of each tank to gain access to tank interiors for decontamination before removal and disposal. Loose residues existing at the bottom of these tanks were removed to the extent practicable by wiping or vacuuming using a HEPA-filtered vacuum assembly and were sampled for tank section designation. All tank sections designated as low-level waste were disposed at LLBG.

The belowgrade 334-A Building concrete tank pit and lower 61 centimeters of the wall were decontaminated to a clean debris surface. The current coating did not require removal (Chapter 2.0, Section 2.1.3). The floor and walls were hand scrubbed to achieve a clean debris surface. To facilitate the decontamination and inspection, tank-pit wall coverings (styrofoam overlain with wire mesh and cement slurry) were removed as debris from the walls to a point 0.76 meter above the floor. The decontamination and inspection to verify achievement of a 'clean debris surface' were documented on a WRRV (refer to Appendix 6A-5). The removed wall coverings and other decontamination debris were collected, designated as low-level waste, and disposed at LLBG.

7.4.3 303-F Building

The 300 Area WATS portion of the 303-F Building included metal pumps P-40 and 50, metal transfer piping protruding above pipe trench grating in the building (including two in-line cartridge filters), and the metal-lined catch basin.

Transfer piping, pumps, and cartridge filters were removed during closure as debris, designated as low-level waste, and disposed at LLBG.

The catch basin housing the stainless steel liner is constructed of concrete covered with acid brick. The acid brick was removed to achieve a clean debris surface for these areas. The acid brick removal activity and the clean debris surface inspection are documented on a WRRV (refer to Appendix 6A-6). The acid brick debris was collected, designated as low-level waste, and disposed at LLBG.

The surface of the metal catch basin liner and the lower 0.6 meter of the east and south coated concrete block wall immediately adjacent to the catch basin were decontaminated of visible, white waste residues by hand scrubbing to a 'clean debris surface'. The decontamination and clean debris surface visual acceptance were documented on a WRRV (refer to Appendix 6A-8). Decontamination solutions, rags, etc., were collected, designated as low-level waste, and disposed at LLBG.

7.5 PHASE 3 CLOSURE ACTIVITIES

Phase 3 closure will include the activities necessary to clean close 300 Area WATS portions of the 334 and 311 Tank Farms, to complete clean closure activities for the 333 and 303-F Buildings by removing 300 Area WATS piping from these buildings, and to remove 300 Area WATS piping from the WATS and U-Bearing Piping Trench. Phase 3 closure activities have begun in accordance with the Ecology-approved DIP (HNF-2814) and tentatively are scheduled to be completed in September 1999. Decontamination and clean debris surface inspections will be documented on the appropriate task-specific WRRV identified in the Phase 3 DIP.

7.5.1 333 Building

Phase 3 closure will complete clean closure activities for the 333 Building begun during Phase 2. Phase 3 closure activities for the 333 Building will consist of removal and disposal of 300 Area WATS PVC drain piping from 300 Area WATS tanks 7 and 11 and non-300 Area WATS tanks 5, 9, 13, 15, 19, 26, and 31 to the 334-A Building storage tanks. These drain lines are located in pipe trenches within the 333 Building and between the 333 and 334-A Buildings. The trench structure is a portion of the WATS and U-Bearing Piping Trench that is outside the scope of 300 Area WATS closure.

Piping will be disconnected from the drain valves beneath these tanks and removed from the trench. Trench grating will be removed to gain access to piping for removal and will be replaced. Piping debris will be designated and managed as described in Section 7.2.2. Removal of this piping will be documented in the field logbook. No WRRV will be generated for this activity.

7.5.2 303-F Building

Phase 3 closure will complete clean closure activities for the 303-F Building begun during Phase 2 closure. Phase 3 closure activities for the 303-F Building will consist of removing and disposing of 300 Area WATS stainless steel and PVC piping located in the WATS and U-Bearing Piping Trench that is between the 313, 334-A, and 303-F Buildings and inside the 303-F Building. The trench structure is outside the scope of 300 Area WATS closure.

Concrete blocks, cover plates, and grating covering the trench will be removed to gain access to piping. The blocks, cover plates, and grating will be replaced after piping removal. Piping debris will be designated and managed as described in Section 7.2.2. Removal of this piping will be documented in the field logbook. No WRRV will be generated for this activity.

7.5.3 The 311 Tank Farm

Closure of 300 Area WATS portions of the 311 Tank Farm will address the following: tanks 40 and 50, pump 10; transfer piping at the tank farm and in the pipe trench, and the concrete catch basins around tanks 40 and 50. The 311 Tank Farm is outdoors and all components are exposed to the weather.

7.5.3.1 Tanks 40 and 50

Tanks 40 and 50 are expected to be clean closed and remain in place after closure. Alternatively, if during closure, removal is determined to be a cost-effective method of disposition, the tanks would be removed as debris.

Remaining tank(s) will have the interior and exterior decontaminated to a clean debris surface using a high-pressure water wash or by hand washing. Before decontamination, piping will be disconnected from the tank. The tank 40 stainless steel outer jacket will be removed to gain access to exterior surfaces for decontamination. Sludge in tank 40 will be removed before tank decontamination. Only minor cracks exist in concrete containment coatings and crack repair or sealing will occur before decontamination. Decontamination solutions and materials will be collected, such as by using liners placed in the existing catch basins, containerized, designated, and managed as described in Section 7.2.2. Decontaminated tank surfaces will be inspected to verify achievement of a clean debris surface and the inspections documented on a WRRV.

Alternatively, tanks 40 and 50 could be removed as debris. If removed, all but tightly adhered residues would be removed from tank interiors to facilitate designation as low-level waste, thereby reducing the generation of mixed waste. The tanks will be removed whole or in sections, whichever is deemed most appropriate at closure. On removal, the tanks or tank sections would be designated as described in Section 7.2.2 and managed accordingly. The concrete supports for each tank would remain in place and would be addressed as discussed in Section 7.5.3.3.

7.5.3.2 Pump 10 and Transfer Piping

Loadout pump P-10 and stainless steel transfer piping from the 303-F and 313 Buildings will be removed from the tank farms as debris. The material will undergo waste designation and will be managed as described in Section 7.2.2.

7.5.3.3 Concrete Catch Basin for Tank 40

The tank 40 concrete containment catch basin and tank concrete support pedestals will remain after closure and must meet the clean debris surface standard. Because no spills occurred to bare concrete surfaces (Chapter 3.0, Section 3.2.6), all concrete surfaces will be addressed in the same fashion. The bottom of the basin and 30.5 centimeters up the basin sides will be decontaminated by hand washing or scrubbing to a clean debris surface. This decontamination will be documented on a WRRV. The through-wall penetration sleeve at the lowpoint drain will be decontaminated and inspected for dangerous waste staining. The drain valve will be removed and replaced with a new valve at closure. All decontaminated portions of the basin, including the drain penetration sleeve, will be inspected to verify achievement of a clean debris surface and the inspection documented on a WRRV. Decontamination solutions and materials will be collected, designated, and managed as described in Section 7.2.2.

7.5.3.4 Concrete Catch Basin for Tank 50

The tank 50 concrete containment catch basin will remain after closure and so must meet the clean debris surface standard. No spills to this basin are documented (Chapter 3.0, Section 3.2.6). However, the bottom of the basin and 30.5 centimeters up each basin wall will be washed down/scrubbed. The piping and valve for the floor drain located at the northeast corner of the basin (Chapter 2.0, Section 2.1.7) will be removed, designated, and disposed. The drain cover will be removed and the drain will be cleaned. The cleaning activities will be documented on a WRRV. The pad and drain will be inspected to verify existence of a clean debris surface and the inspection documented on a WRRV. Decontamination solutions and materials will be collected, designated, and managed as described in Section 7.2.2.

7.5.4 334 Tank Farm

300 Area WATS portions of the 334 Tank Farm include the portion of the painted metal structure that supported tank 4 (now removed) and the concrete containment pad directly beneath where tank 4 existed. The concrete drainage trench directly beneath the tank 4 location is a portion of the WATS and U-Bearing Piping Trench and is outside the scope of 300 Area WATS closure.

7.5.4.1 Tank 4 Support Structure

The tank 4 metal support structure will remain after closure and must meet the clean debris surface standard. Portions of the structure that potentially contacted waste from the single spill in 1986 will be decontaminated to a clean debris surface. Because the paint is an integral part of the debris matrix, the clean debris surface standard is achievable without removal of the paint. Loose rust, scale, and visible residues will be removed by scraping, brushing, and/or scrubbing. The decontamination will be documented on a WRRV.

The decontaminated surface will be inspected for a clean debris surface and the inspection documented on a WRRV. The structure surface after decontamination will be tightly adhered paint with indications of weathering or oxidation and/or will be bare metal, likely showing indications of corrosion (rust or pitting). Visible rust or oxidation that is not stained from dangerous waste could remain on portions of the structure and not affect achievement of a clean debris surface. All rinsates or decontamination materials (e.g., rags, brushes) will be collected, designated, and managed as described in Section 7.2.2.

7.5.4.2 Containment Pad

The bermed concrete pad will remain after closure and must meet the clean debris surface standard. This pad is not expected to be contaminated (Chapter 3.0, Section 3.2.3) but will be cleaned. The pad will be washed down/scrubbed using scrub brushes, abrasive pads, nonregulated detergents, and/or bleach. The pad will be inspected for a clean debris surface. The decontamination and final inspection will be documented on a WRRV. The trench structure is a portion of the WATS and U-Bearing Piping Trench and is outside the scope of 300 Area WATS closure.

7.6 OTHER ACTIVITIES REQUIRED FOR CLOSURE

Temporary containment 'greenhouse' structure(s) for control of airborne contamination from decontamination activities will be constructed in accordance with the appropriate job safety documents to provide negative air pressure, airlock entry and exits, HEPA filtration, and other attributes, as necessary, to protect personnel and the environment.

All equipment brought onsite and used during closure activities will be decontaminated, reused, or disposed using onsite methods.

After partial closure, the unit will no longer be operating and waste will no longer be managed. The unit will remain open and will be addressed as a dangerous waste management unit in the following manner. The concrete structures over the unclosed, potentially contaminated soil identified in Chapter 3.0 will be inspected annually for cracks or major degradation. Such conditions will be repaired to ensure that potential soil contamination at these locations remains immobilized. A building emergency plan, personnel training, waste acceptance plan, or contingency plan will not be required for the unit after partial closure.

7.7 PERSONNEL TRAINING

Table 7-1 contains a brief description of training courses that fulfill WAC 173-303-330 requirements for personnel performing closure activities at a TSD unit potentially containing mixed waste. Before performing actual closure activities, site-specific work plans detailing specific work activities, site conditions, hazard characteristics, and closure equipment will be available to Ecology upon request. These documents might provide additional personnel training requirements than those described in Table 7-1.

7.8 SCHEDULE OF CLOSURE

Because of its size and complexity, closure of the 300 Area WATS will occur in two steps over an extended closure period. The first step is partial closure being performed in three, Ecology-approved phases (Phase 1 through 3). Phase 1, in accordance with Figure 7-5, addressed closure of the 313 Building, which was completed September 1997. Phase 2, in accordance with Figure 7-6, addressed closure of the 333, 334-A, and the 303-F Buildings, which was completed September 1998. Phase 3 closure currently is underway, in accordance with Figure 7-7, and addresses closure of the 311 and 334 Tank Farms and 300 Area WATS piping in the WATS and U-Bearing Piping Trench. Phase 3 closure is scheduled to be completed in September 1999. If the time required to complete Phase 3 closure activities exceeds 180 days from the time of closure plan approval, Ecology approval of an extension of the partial closure period will be requested.

Final closure will be coordinated with the future remedial action for the 300-FF-2 OU that will occur in accordance with future Tri-Party Agreement milestones. Completion of final closure therefore will require longer than the normal 180-day closure period. By approval of this closure plan, Ecology is granting a WAC 173-303-610 (4)(b) extension to the closure period.

7.9 AMENDMENT OF PLAN

The closure plan for the 300 Area WATS will be amended as described in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28).

7.10 CERTIFICATION OF CLOSURE

Certification of final closure will be as described in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28).

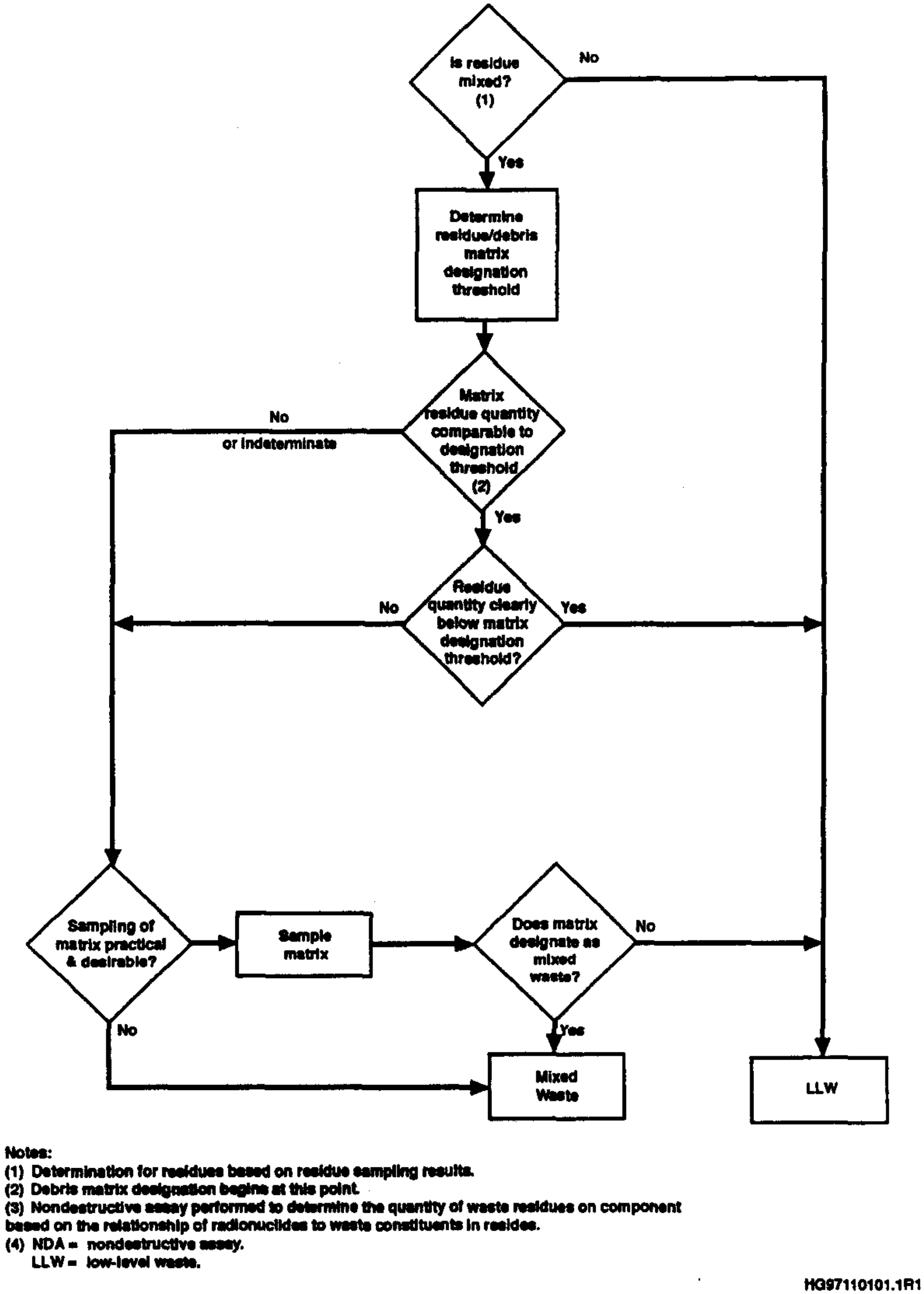

Figure 7-1. Logic Flowpath for Designation of Waste Acid Treatment System Debris that Contacted System Residues.

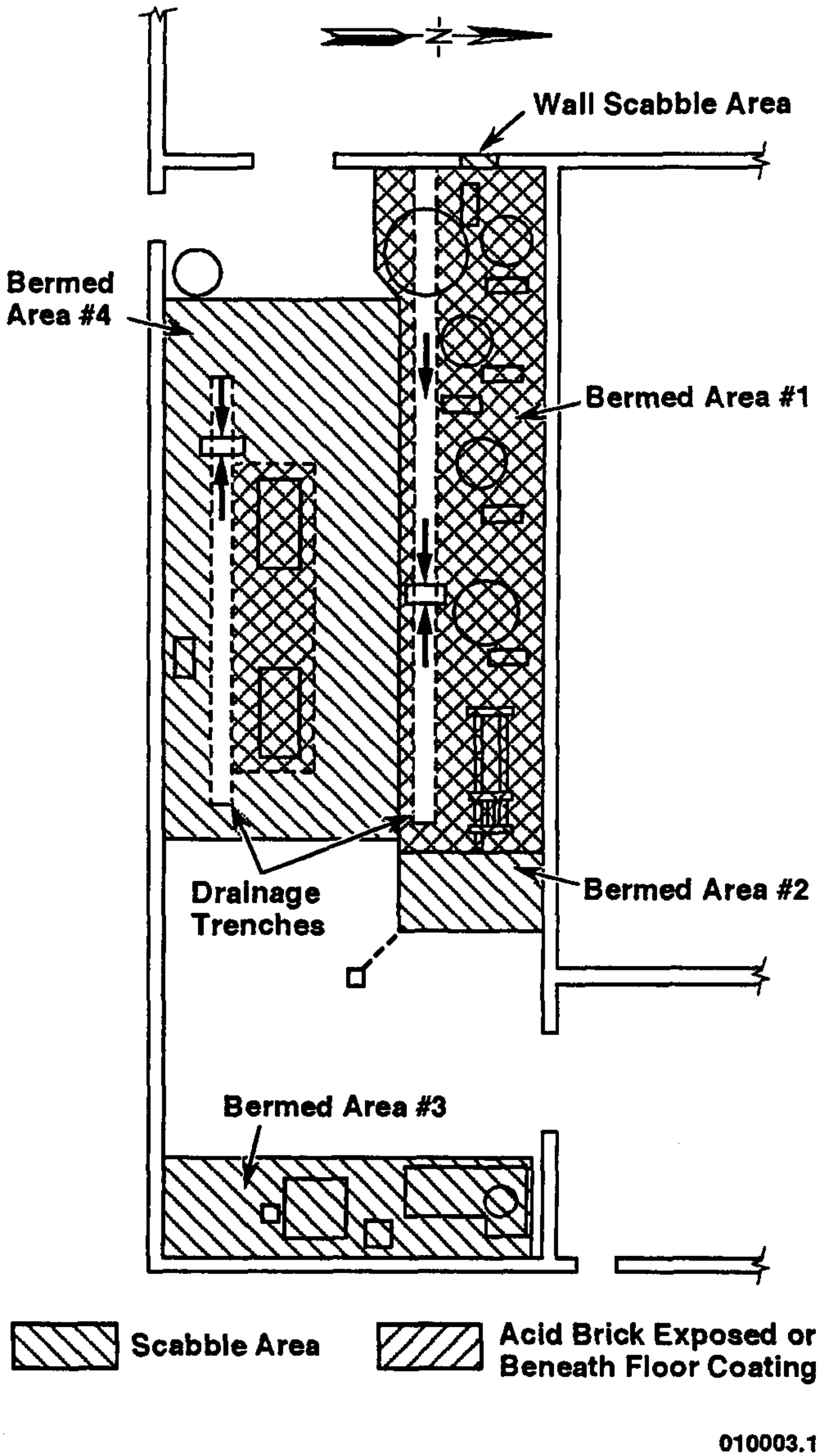

Figure 7-2. Plan View 313 Uranium Recovery Room Scabble Area.

EXAMPLE WASTE AND RESIDUE REMOVAL VERIFICATION
300 Area Waste Acid Treatment System

This checklist is intended to document a 'clean debris surface' for the following 300 Area WATS components, structures and/or materials.

1. Building/location: ________
2. Component(s)/Area(s): ______________________
3. Material (e.g., concrete, metal, plastic): ____________
4. Decontamination
   A. Method[1] (NA if not performed): ______
   B. Parameters (check/fill in appropriate parameters):
      [ ] Temperature ___________
      [ ] Propellant ___________
      [ ] Solid Media (e.g., shot, grit, beads) ___________
      [ ] Pressure ___________
      [ ] Residence time ___________
      [ ] Surfactant(s) ___________
      [ ] Detergents ___________
      [ ] Grinding/striking media (e.g., wheels, piston heads) ____
      [ ] Depth of surface layer removal (cm) (e.g., for concrete)
      [ ] Other ___________

   C. The decontamination of the components/areas/materials identified in steps 1 through 3 was completed as specified at step 4.

      ______________ ________/______
      Title Signature Date

5. Performance Standard:

   The identified material(s) have been inspected visually and a clean debris surface[2] has been attained.

   Authorized Representative: __________/__________
   Signature Date

[1] Although not mandatory, decontamination may use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45). Treatment will use an appropriate Table 1 method.
[2] Clean debris surface as defined in Table 1, "Alternative Treatment Standards for Hazardous Debris" (40 CFR 268.45): Surface, when viewed without magnification, is free of all visible contaminated soil and dangerous waste, except allowed as follows:

- Residual staining from soil and waste consisting of light shadows, slight streaks, and minor discoloration.
- Soil and waste in cracks, crevices, and pits limited to no more that 5 percent of each square centimeter of surface area.

Note: This verification form is based on Debris Rule performance standards of 40 CFR 268.45 and does not originate in regulations or guidance documents.

Figure 7-3. Example Waste and Residue Removal Verification.

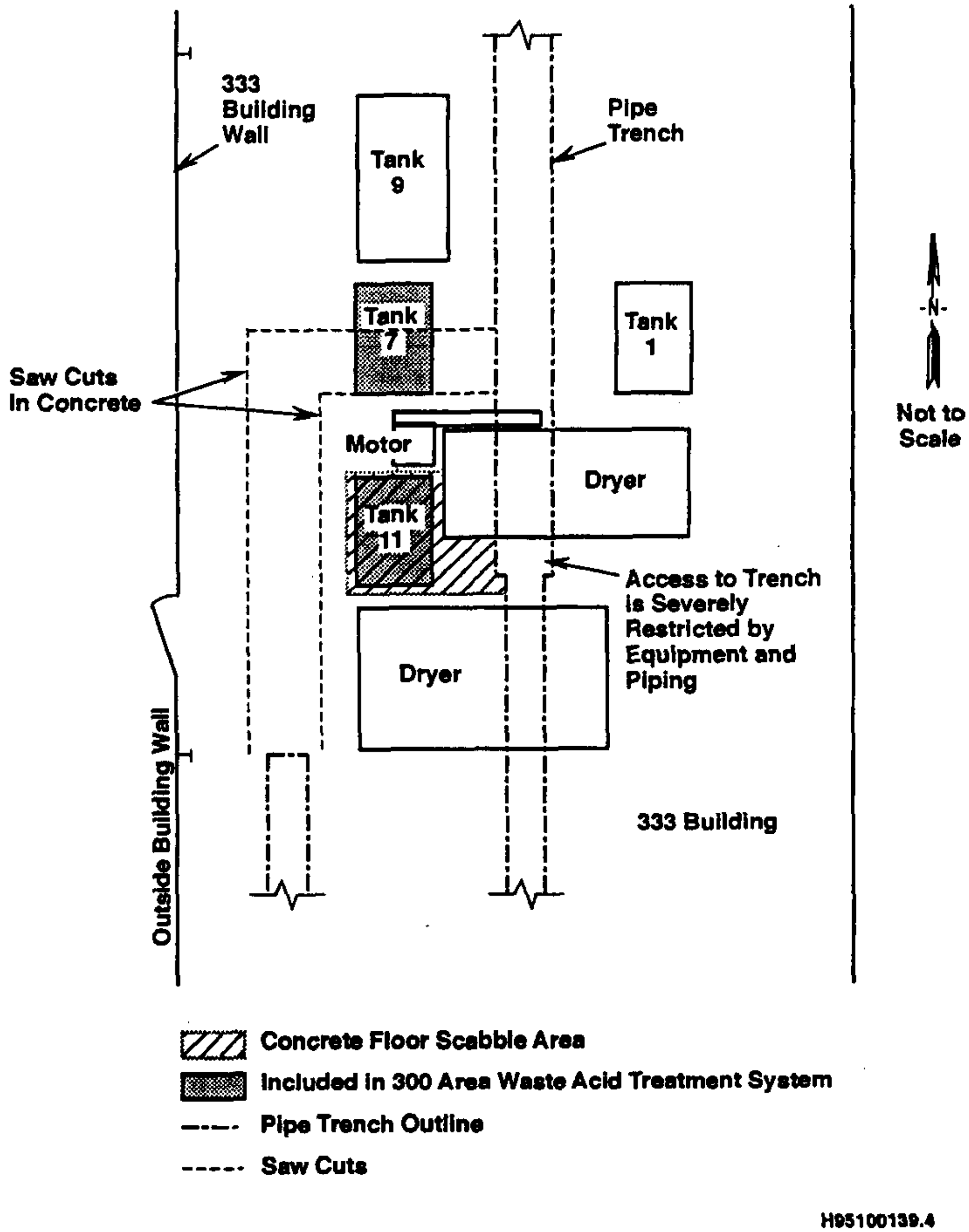

Figure 7-4. The 300 Area Waste Acid Treatment System Portion of the 333 Building.

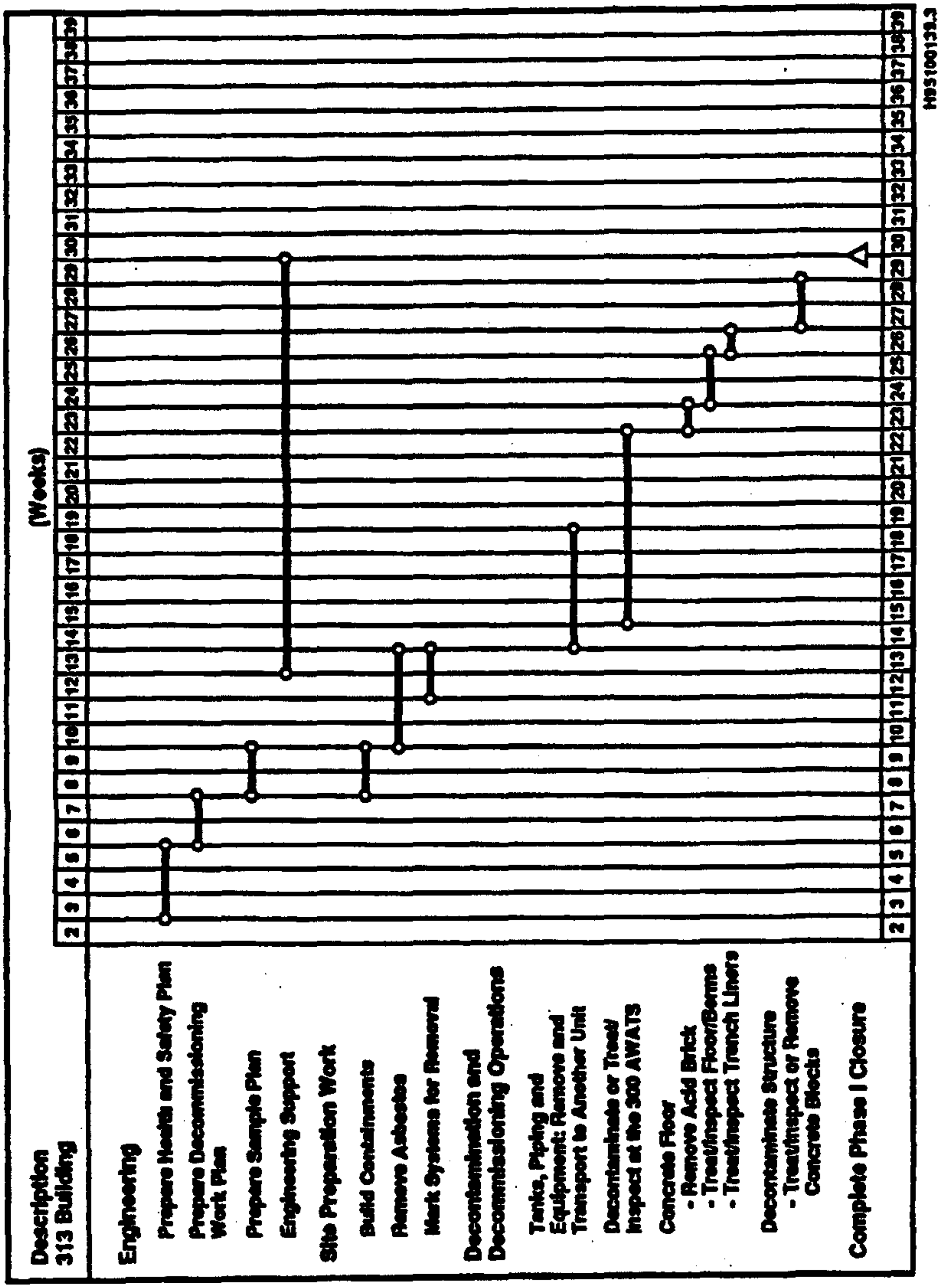

Figure 7-5. Phase 1 Closure Schedule (Completed).

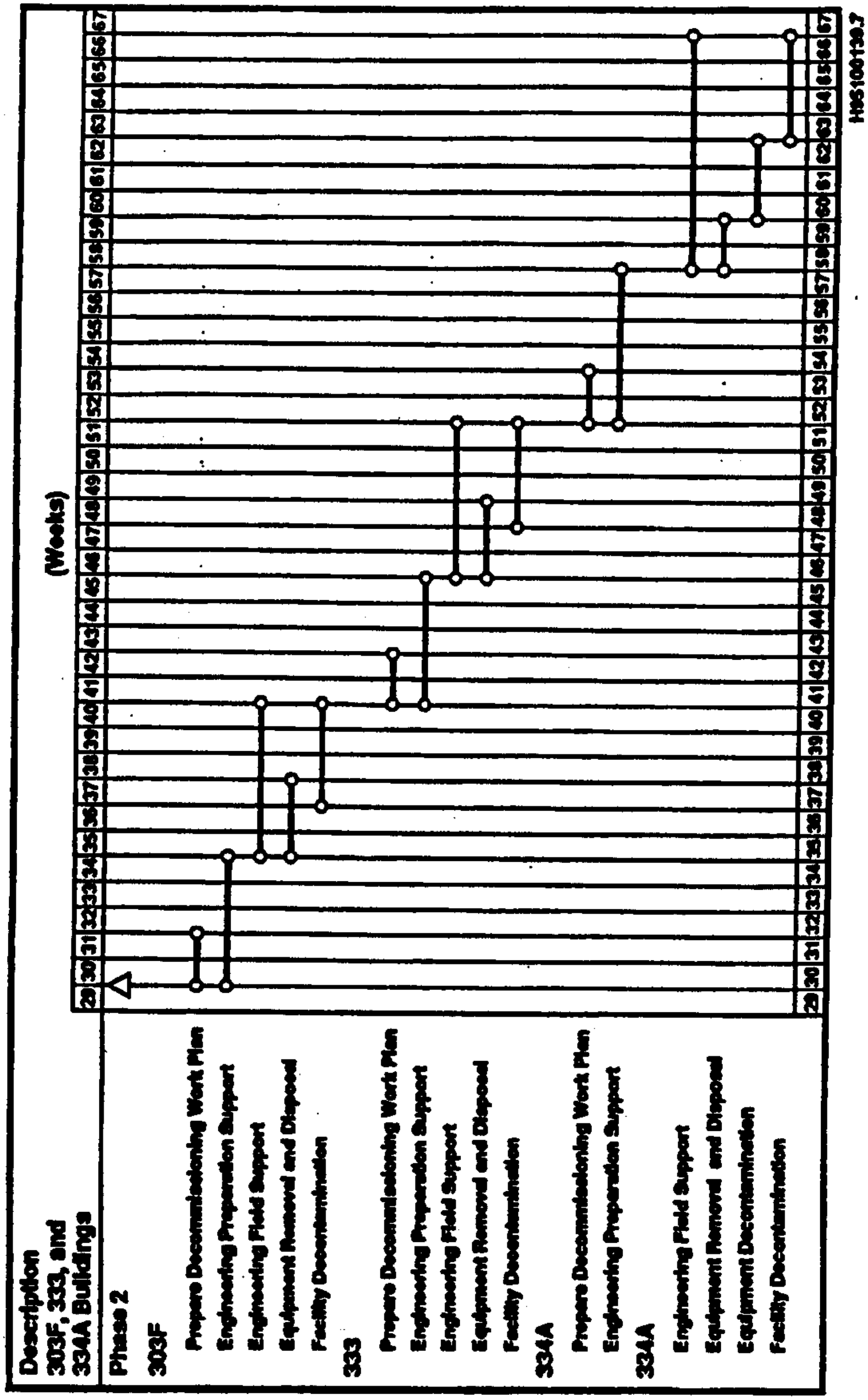

Figure 7-6. Phase 2 Closure Schedule (Completed).

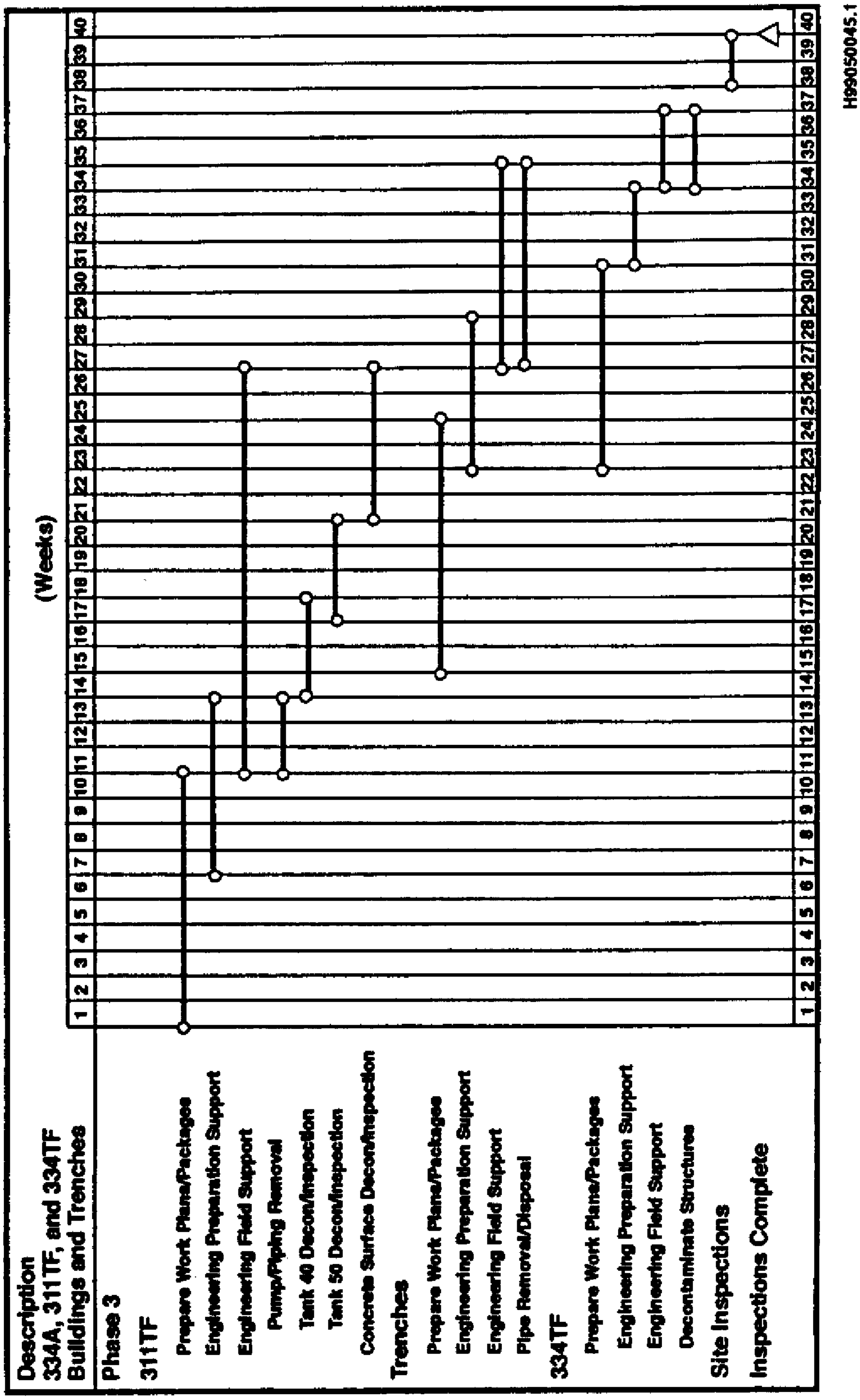

Figure 7-7. Phase 3 Closure Schedule.

Table 7-1. Training Requirements for Resource Conservation and Recovery Act Closure Plan Activities.

	Course number	Course Name	Description
1.	000001	Hanford General Employee Training	Course provides a refresher overview of the federal and applicable hazard communication programs and hazardous and/or dangerous waste programs for all employees.
2.	02006G	Waste Management Awareness	Course provides the hazardous and/or dangerous material/waste worker who generates dangerous or mixed waste with the fundamentals for use and disposal of hazardous and/or dangerous materials.
3.	03E972	Unit-specific contingency plan/hazard/communication/ emergency preparedness	Course (s) provides specific information on hazardous and/or dangerous chemicals and waste management at the employees' TSD unit.
4.	020159	Advanced Course 2 - Hazardous Waste Shipper Certification	Course provides an in depth look at federal, state, and Hanford Site requirements for nonradioactive hazardous and/or dangerous waste management and transportation.
5.	035010	Waste Designation	Course provides dangerous waste designation per WAC 173-303.
6.	035020	Facility Waste Sampling and Analysis	Course provides waste sampling methodologies according to EPA Protocols SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Course also addresses sampling plan, field and laboratory quality assurance/quality control (QA/QC) and use of sampling equipment.
7.	035100	Container Waste Management - Initial	Course provides general training requirements for waste management in containers at 90-day accumulation areas and TSD units.
	035110	Requalification	
8.	035120	Waste Management Administration	Course provides the administrative aspects of dangerous and/or mixed waste management and covers regulatory and company policies, forms, reports, forecasts and plans.
	035130	Requalification	
9.	02028B	Building Emergency Director Training	Course provides an overview of the responsibilities of the building warden and identifies building emergency organizations, emergency actions, implementing the contingency plan, and drill and exercises requirements.
	037510	Requalification	

CONTENTS

8.0 POSTCLOSURE

This closure plan proposes clean or modified closure of the 300 Area WATS in two steps occurring over an extended closure period. The first step will be partial clean closure of portions of the TSD under this closure plan. The second step will be final closure to occur at a later date (Chapter 6.0). As described in Chapter 7.0, Section 7.6, during the period between partial and final closure, an annual inspection and maintenance, if required, will occur, which does not equate to postclosure care.

Postclosure care would be required if the unit cannot be clean closed at the time of final closure. Under these conditions, alternative RCRA unit closure methods are landfill closure and modified closure. Landfill closure will not be considered here because, as with the adjacent 300-FF-1 [source] OU, the 300-FF-2 CERCLA [source] OU ROD is anticipated to require cleanup to industrial levels that will, at a minimum, qualify the unit for modified closure. Modified closure could occur if RCRA unit dangerous waste constituents in soil exceed the clean closure performance standards of WAC 173-303-610 (2)(b)(i) but do not exceed MTCA, WAC 173-340-745, Method C cleanup levels. Modified closure (if necessary) would not occur until a determination was made that soil contamination would not be remediated under the CERCLA 300-FF-2 OU cleanup action to RCRA clean closure standards. Modified closure would occur under the conditions of the *Hanford Facility RCRA Permit*, Section II.K.D. Postclosure requirements for inspections, maintenance, monitoring, institutional controls, and periodic assessments at the site during a modified closure period would be in accordance with a postclosure permit application. This closure plan would be revised to include the conditions of modified closure as stipulated in a postclosure permit application if modified closure occurs.

CONTENTS

9.0 REFERENCES

BHI, 1993, *300-FF-2 OU Technical Baseline Report*, BHI-00012, Bechtel Hanford, Inc., Richland, Washington.

DOE/RL-89-14, *Draft Remedial Investigation/Feasibility Study Work Plan for the 300-FF-5 Operable Unit, Hanford Site, Richland, Washington*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-91-28, *Hanford Facility Dangerous Waste Permit Application, General Information Portion*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-92-24, *Hanford Site Background: Part 1 Soil Background for Nonradioactive Analytes*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-93-21, *Phase III Feasibility Study*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-94-85, *The 300-FF-5 Operable Units Remedial Investigation/Feasibility Study Report*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, et al, 1996, *Declaration of the Record of Decision for 300-FF-1 and 300-FF-5 Operable Units*, July 17, 1996, U.S. Department of Energy, Richland Operations Office, U.S. Environmental Protection Agency Region 10, and Washington State Department of Ecology.

Ecology 94-111, *Guidance for Clean Closure of Dangerous Waste Facilities*, Washington State Department of Ecology, Olympia, Washington.

Ecology 94-145, *Model Toxics Control Act Cleanup Levels and Risk Calculations (CLARC II) Update*, Washington State Department of Ecology, Olympia, Washington.

Ecology, EPA, and DOE, 1999, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, U.S. Department of Energy, Olympia, Washington.

EPA, 1994, *Environmental Protection Agency's Integrated Risk Information System*, U.S. Environmental Protection Agency, Washington, D.C.

ERC, 1998, *Environmental Restoration Contractor (ERC) Team Meeting Minutes - RCRA/CERCLA Integration for Closure of the 300 Area Waste Acid Treatment System*, Reference Number #061571, September 3, 1998, Bechtel Hanford, Inc., Richland, Washington

HNF-1784, "Phase 2 Decontamination Inspection Plan", Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-2814, "Phase 3 Decontamination Inspection Plan", Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-ENV-AP-001, "Phase 1 Decontamination Inspection Plan", Westinghouse Hanford Company, Richland, Washington.

APPENDIX 3A

KNOWN SPILLS TO 300 AREA WASTE ACID TREATMENT SYSTEM LOCATIONS PREDATING RESOURCE CONSERVATION AND RECOVERY ACT OPERATIONS AND FROM NON-300 AREA WASTE ACID TREATMENT SYSTEM ACTIVITIES

Table 3A-1. Known Spills Predating the 300 Area Waste Acid Treatment System RCRA Operations. (sheet 1 of 2)

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334-A Building	01-30-76	333 Building - chemical bay	Waste etch acids	HNO_3, HF and CrO_3 acids containing copper, uranium, and zirconium in solution	Small quantity	A chemical reaction occurred when a carbonate-bearing waste solution was added to the tanks in the 334-A Building. This caused foaming, which backed up in the drain line from the 333 Building and over-flowed the process tanks, into the process sewer.	Washed foam into process sewer.	Carbonate-bearing solutions were added to system in Tanks 9 and 10 in 313 Building after this incident.
	06-02-76	334-A Building -storage tanks	Waste etch acids	HNO_3, HF, H_2SO_4, and CrO_3 acids containing copper, uranium, and zirconium in solution	Estimated 18,750 gal of solution (primarily water with some waste etch acids)	Open water fill line in 333 Building caused process tank overflow into the containment pit. The pit when overflowed into the process sewer system. Overflow to the process sewer apparently began at 7:30 a.m. on June 3, and was discovered on the morning of June 5. Due to water input, overflow into the process sewer was primarily water with some acid content (pH 2.8).	Additional solution remaining in the 334-A pit also was drained into the process sewer. (Analysis showed NO_3^- (152 ppm[h]); fluoride (220 ppm); and copper (220 ppm).	Weekly composite process sewer sample did not indicate increased concentration of F^-, NO_3^-, copper, or uranium. Composite pH also was normal. This would imply that release was insignificant in comparison with routine operational releases.
313 Building	12-02-63	313 Building - uranium recovery area	Uranium-bearing acid	HNO_3[a] and H_2SO_4[b] acids containing uranium in solution	Not reported	The 2-in. Saran©-lined black iron pipe leaked.	Not reported	The 2-in. Saran-lined black iron pipe from the 333 Building was replaced with acid resistant stainless-steel line.
	1950 to early 1970	313 Building - uranium recovery area	Uranium-bearing acid possibly in neutralized form	HNO_3 and H_2SO_4 acids containing uranium in solution; NaOH[d] solution when neutralized	Unknown (Substantial)	During repair of a floor in the 313 Building, in early 1970's, solution was found running into a hallway from beneath the acid brick on the floor.	Seeping material was collected and processed through uranium recovery operation.	From recoverable uranium-bearing acid system. Removal of contaminated subfloor was not complete; contamination under repaired floor is still present.

Table 3A-1. Known Spills Predating the 300 Area Waste Acid Treatment System RCRA Operations.
(sheet 2 of 2)

Location	Date	Spill origination point	Material spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
303-F & 311 Tank Farm	1954 to 1986	Caustic storage tanks in 311 Tank Farm	Caustic solution	50% NaOH	Unknown	Tank overflows and minor fitting leaks over the years of use.	None.	Soil around tanks still exhibits high pH necessitating use of chemical resistant suits when excavating in area.
	07-19-63	Pipe trench between 311 Tank Farm and 303-F Building	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	Unknown (Substantial)	The 2-in. Saran-lined black iron pipe leaked into the process sewer. An amount of acid leaking to the process sewer must have been substantial since bottom of concrete trench was severely etched.	Flushed to process sewer.	The 2-in. Saran-lined pipe was replaced with stainless steel in early 1964. The bottom of the pipe trench was relined with concrete in early 1975.
	Prior to 10-74	Process sewer drain from 303-F Building	Caustic solution	NaOH solutions up to 50% concentration	Unknown	In October 1974, it was found that a drain pipe to the process sewer manhole was broken or had dissolved away. From appearances, it had been that way for years.	Replaced damaged pipe.	It is believed that the 50% NaOH solutions had damaged the drain line. The NaOH solutions were routinely discharged from the 303-F Building to the process sewer to keep the 300 Area ponds basic.
334-A Building & 334 Tank Farm	08-01-73	Current site of 334-A Building (before building was constructed)	Waste etch acids	HNO_3, HF[g], and CrO_3 acids containing copper, uranium, and zirconium in solution	About 1,300 gal.	Failure of the limestone neutralization tank resulted in a discharge to the ground. As a consequence of the tank failure, routine operations involved discharging spent waste acids directly into the process sewer system. This practice continued until January 1975. Because of this leak, the 334-A Building and Tanks A, B, and C were installed in late 1974.	Routed to 300 Area Process Pond for disposal. Added 1,810 lb of NaOH to the tank and allowed this solution to drain out the leak to neutralize the soil.	During construction of the 334-A Building, some of the contaminated soil was removed and disposed of in the 200 Area Burial Ground. The estimated amount is NO_3^-[e] (4,432 lb), F^-[f] (96 lb), copper (477 lb), and uranium (3 lb).

[a]HNO_3 = nitric acid
[b]H_2SO_4 = sulfuric acid
[c]Saran is a trademark of Dow Chemical Company.
[d]NaOH = sodium hydroxide
[e]NO_3^- = nitrate ion
[f]F^- = fluoride ion
[g]HF = hydrofluoric acid

Table 3A-2. Known Spills from Non-300 Area Waste Acid Treatment System Activities in the 300 Area Waste Acid Treatment System Location. (sheet 1 of 4)

Location	Date	Spill Origination point	Material Spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
334 Tank Farm	07-16-75	Sulfuric acid high tank	Acid	90% H_2SO_4[a]	About 1,200 gal	A PVC[b] fill line from the sulfuric acid high tank broke in the pipe trench near the tank farm. The acid drained through a limestone pit on the east side of the tank farm into the 618-1 Burial Ground.	The trench was rinsed to the limestone pit. The pipe was repaired.	In 1977, the trench to the limestone pit was blocked and a drain line was installed to the process sewer.
	01-02-81	334 outside storage tank area	Acid	57% HNO_3[c]	About 94 gal	Valve was found leaking around packing at the HNO_3 acid storage tank.	Valve packing was tightened, stopping the leak. Washed spill area into process sewer.	Weekly composite process sewer sample showed NO_3^-[d] content of 63.5 ppm[e]. Average value during normal week was 30 ppm. Based on a total process sewer flow of 2,081,400 gal, ~600 lb of HNO_3 could be attributed to the spill. Current CERCLA[f] RQ[g] for HNO_3 is 1,000 lb in a 24-h period.
313 Building	06-18-80	Uranium recovery area	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	Unknown	Overflow of storage tank in 313 Building, resulting in an overflow of catch barrel into the process sewer system.	Open valve was closed, stopping overflow. Washed spill area into process sewer.	Weekly composite process sewer sample showed level of 38 ppm No_3^- and 0.5 ppm uranium. Average of normal operating week was 6 ppm NO_3^- and 0.1 ppm uranium. Using a weekly flow of 102,000 gal, 24 lb of HNO_3 and 0.3 lb of uranium could have been involved in this release. CERCLA RQ for HNO_3 is 1,000 lb; RQ for $UO_2(NO_3)_2$[h] is 100 lb.
	06-15-81	Uranium recovery area	Caustic	50% NaOH[i]	Unknown	Corroded fill line to Tanks 2 and 6 leaked NaOH to process sewer.	Replaced corroded fill line.	The pH was 11.37 for 313 Building process sewer system.
	09-14-81	Uranium recovery area	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	Unknown	Transfer of acid from one storage tank to the other resulted in overflow when the receiving tank level gage failed to operate properly.	Spilled solution was washed into process sewer.	Estimated 2.5 lb of uranium; 11.5 lb of HNO_3. Estimated release quantities are small compared with current CERCLA RQs of 1,000 lb and 100 lb of HNO_3 and $UO_2(NO_3)_2$[i] respectively. an alarm was installed in the catch drum.

Table 3A-2. Known Spills from Non-300 Area Waste Acid Treatment System Activities in the 300 Area Waste Acid Treatment System Location. (sheet 2 of 4)

Location	Date	Spill Origination point	Material Spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
313 Building (cont)	06-05-82	Uranium recovery area	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	30 gal of acid	In order to provide additional storage capacity, drums were placed in the 313 Building to receive waste acids from the 333 Building. Carbon steel drums were used, which rapidly dissolved and spilled solution into the process sewer.	Solution was flushed into process sewer.	Estimated quantity of uranium (13 lb as $UO_2(NO_3)_2$) was well below current CERCLA RQ of 100 lb. Personnel were instructed not to use carbon-steel drums for HNO_3 - only stainless-steel or plastic drums.
	11-04-82	Uranium recovery area	Degreasing solvent	Perchloroethylene (tetrachloroethylene)	126 gal (approximately)	On 11-03-82, the degreaser solution was drained into the process sewer system during cleanout effort 401.26 liters (106 gallons). On 11-04-82, an additional 75.7 liters (20 gallons) were discharged as a result of the drain valve on the degreaser still being open.	Valve was closed, stopping further release. Floor area was washed into process sewer.	The estimated perchloroethylene release (126 gal) represents about 1,700 lb of material. The current CERCLA RQ for this substance is 1 lb.
	06-30-83	Uranium recovery area	Neutralized uranium-bearing etch solution	$NaNO_3^j$, $Na_2SO_4^k$, and uranium precipitates	Unknown	Failure of mechanical seal at uranium acid neutralizer tank resulted in release into process sewer.	Neutralizer tank was emptied to prevent further release. Pump was repaired.	The weekly composite process sewer sample showed approximately normal level of F^- and copper. Uranium concentration was elevated (1.7 ppm vs 0.03 ppm typically) as was NO_3^- (21 ppm vs 6 p/m normally). Based on a total process sewer flow of 298,800 gal, the spill could have involved 4 lb of uranium and 51 lb of $NaNO_3$.
	06-03-84	Uranium recovery area	Neutralized uranium etch solution	$NaNO_3$, Na_2SO_4, and uranium precipitates	Approximately 10 gal of solution containing about 1 lb of uranium	A pH meter drain valve at the uranium acid neutralization tank was left open, allowing solution to be discharged into the process sewer.	Material on floor, which hadn't reached process sewer, was absorbed. Open valve was closed, stopping discharge.	Quantities of materials involved were well below any CERCLA RQ limits.

Table 3A-2. Known Spills from Non-300 Area Waste Acid Treatment System Activities in the 300 Area Waste Acid Treatment System Location. (sheet 3 of 4)

Location	Date	Spill Origination point	Material Spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
313 Building (cont)	09-18-84	Uranium recovery area	Degreasing solvent	Perchloroethylene	12 gal	An open valve at the end of an out of service degreaser line released perchloroethylene into a work area in the south east corner of the building. Event occurred when operators pressurized the perchloroethylene pumping line to fill some barrels in the 303-F Building.	Valve was closed, and unused line was removed. Spill was absorbed with pads, collected in containers beneath line, and recovered in sump near line.	No spilled solvent was believed to have entered the process sewer.
	02-??-85	313 Building - process sewer	Uranium-bearing and waste etch acids and neutralized waste	HNO_3 and H_2SO_4 acids with uranium in solution; and HNO_3, HF and CrO_3 acids with uranium, copper, and zirconium in solution. $NaNO_3$, Na_2SO_4, NaF, and $Na_2Cr_2O_7$ solution with precipitates of copper, chromium uranium, and zirconium	Unknown	In January 1985, while a new extrusion press was being installed, a leak was discovered in a section of the process sewer line. the leak resulted in a discharge to the ground. It is unknown when the leak started. Spills and routine discharges in the 313 Uranium Recovery Area could have entered this line, resulting in ground disposal of hazardous substances.	None.	The entrances to the leaky section of process sewer were plugged in 1987.
	08-07-88	Uranium recovery area	Caustic solution	25% NaOH	Less than 1 qt.	Failed pump seal in Pump 6 resulted in caustic leak into process sewer over weekend.	Area was flushed into process sewer and pump isolated. Seal was repaired, pump was replaced, and weekend surveillance initiated.	Not a reportable quantity.
303-F Building & 311 Tank Farm	01-12-80	Caustic storage tank in 311 Tank Farm	Caustic solution	50% NaOH	Very small quantity	Condensate from steam heating line in storage tank caused overflow into process sewer.	None. Steam line was shut off to stop discharge.	Less than 1/10 lb of NaOH. Insignificant in comparison with CERCLA RQ of 1,000 lb for NaOH.
	09-22-80	Caustic storage tank in 311 Tank Farm	Caustic solution	50% NaOH	290 gal	A defective valve in the storage tank steam sparge line allowed steam condensate to overflow the storage tank into the process sewer system.	None. A second steam valve was closed, stopping overflow.	Weekly composite process sewer samples showed pH of 11.9. The 290 gal of 50% NaOH corresponds to 1,660 lb (as NaOH). The current CERCLA RQ for NaOH is 1,000 lb.

Table 3A-2. Known Spills from Non-300 Area Waste Acid Treatment System Activities in the 300 Area Waste Acid Treatment System Location. (sheet 4 of 4)

Location	Date	Spill Origination point	Material Spilled	Chemical constituents	Quantity spilled	Description of event	Cleanup action	Comment
303-F Building & 311 Tank Farm (cont)	01-06-81	Transfer line in trench from 311 Tank Farm to 333 Building	Degreasing solvent	Perchloroethylene	About 116 gal unrecovered	Hose connection in transfer line blew off allowing solvent to drain into railroad underpass. The connection had been improperly installed.	255 gal were removed. The unrecovered solvent evaporated.	No solvent reached the process sewer. The transfer line was removed from service and further solvent transfers from the 311 Tank Farm were done in 55-gal drums.
	09-06-83	303-F Building - caustic mix tank	Caustic solution	NaOH solution	1,200 gal maximum	A slow leak through a water fill valve caused drip overflow of the caustic mix tank in the 303-F Building. The actual cause of the leak was discovered a day after the first indication of high pH in the 313 process sewer system. The weekly sample evidenced a high pH (11.9). Valve was replaced.	None.	A weekly process sewer composite pH indicates a total NaOH release of about 1,200 lb (based upon 462,000 gal total stream flow). This quantity was spread over a few days and appears high when compared with the slow drip nature of the spill. The CERCLA RQ for NaOH is 1,000 lb in a 24-h period.
	02-27-85	Overhead pipe in 311 Tank Farm	Uranium-bearing acid	HNO_3 and H_2SO_4 acids containing uranium in solution	<10 gal	A leak from the uranium-bearing acid transfer line occurred as a result of a gasket failure caused by freezing of the solution in the line. Analyses showed solution contained NO_3^- (3,460 ppm), $SO_4^{=}$ (6,960 ppm), and uranium (920 ppm). Ground beneath showed radioactive contamination from spill.	Some soil was exhumed, packaged, and sent to 200 Area for burial.	Lines above heated pipe trenches were heat taped and insulated.
	11-11-86 and 11-14-86	311 Tank Farm area - pipe trench	Caustic solution	50% NaOH solution	Small quantity	The 313 process sewer pH monitoring system rose to about 10.0 on 11-11-86 and to about 11.0 on 11-14-86, indicating a caustic solution release. Investigation showed that a sump in the 311 Tank Farm (which discharges into the process sewer) contained some caustic material. It appears that material was washed into the sump via rainwater flow through the piping trenches, which contained a small quantity of NaOH from a previous release.	Attempt was made to neutralize solution in sump.	A weekly process sewer composite sample pH was 8.4, compared with an average composite value of about 7.2. This would indicate a NaOH release of <0.1 lb. This quantity is insignificant compared with the CERCLA RQ for NaOH of 1,000 lb. Total weekly process sewer flow was 68,200 lb.

[b] H_2SO_4 = sulfuric acid
[c] PVC = polyvinyl chloride
[d] HNO_3 = nitric acid
[e] NO_3 = nitrate ion
[f] ppm = parts per million
[g] CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
[h] RQ = recordable quantity
[i] $UO_2(NO_3)_2$ = uranyl nitrate
[j] NaOH = sodium hydroxide
[k] $NaNO_3$ = sodium nitrate
[l] Na_2SO_4 = sodium sulfate
SO_4 = sulfate ion.

APPENDIX 3B

NONROUTINE CHEMICAL WASTE TREATED IN THE 300 AREA WASTE ACID TREATMENT SYSTEM BEFORE NOVEMBER 19, 1980.

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 1 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
1-75	07/21/75	Used sulfamic-acid-based proprietary solution from film developing process	35		pH = 1.7 684 ppm[a] chromium 34 ppm iron 14 ppm aluminum
2-75	12/11/75	Used chromium plating solution	55		Total acid normality = 1.9 >20,000 ppm chromium 2,000 ppm copper 1,000 ppm iron 20 ppm barium 40 ppm cadmium 10 ppm molybdenum
3-75	12/12/75	Synthetic salt solution; Initial makeup was: Sodium hydroxide-13% Sodium aluminate-5% Sodium nitrate-24% Sodium nitrite-8% Water-50%	495		pH = 12.0 Spectrochemical analysis showed no heavy metals
1-76	1/15/76	Unused oxalic acid Formic acid		70 2	None None
2-76	1/15/76	Unused chemicals: Hydrobromic acid Hydroiodic acid Perchloric acid Phosphoric acid Hydrochloric acid Hypophosphorus acid	 5 0.5 1	 19 2 3	None
4-76	1/19/76	Used absorbing solution containing mercuric chloride (0.067 lb/gal), ethylenediaminetetraacetic acid (0.01 lb total), and potassium chloride (0.05 lb/gal)	20		None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 2 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
5-76	1/30/76	Used battery acid containing sulfuric acid and lead	240		None
6-76	2/02/76	Used battery acid containing sulfuric acid and lead	140		None
7-76	2/17/76	Used battery acid containing sulfuric acid and lead	52		Approximately 2 lb sulfuric acid/gal 1 ppm lead 2 ppm barium 1 ppm cobalt 5 ppm chromium 2 ppm copper 5 ppm nickel
8-76	2/20/76	Used battery acid containing sulfuric acid and lead	275		None
9-76	3/08/76	Unused oxalic-acid-based proprietary chemicals:			
		Chemical 1		45	10,000 ppm calcium
		Chemical 2		30	500 ppm calcium 200 ppm sodium
		Chemical 3		26	20,000 ppm sodium 2,000 ppm calcium
		Chemical 4	6		pH = 4.39 >5,000 ppm sodium
10-76	3/08/76	Unused ethylenediaminetetra-acetic acid-based chemicals:			
		Chemical 1	3		>5,000 ppm sodium
		Chemical 2	3		>5,000 ppm sodium
		Chemical 3		35	50 ppm calcium
		Chemical 4		100	200 ppm sodium
		Chemical 5		25	200 ppm sodium
11-76	3/08/76	Unused chemicals:			
		Sodium hydrosulfite		75	None
		Sodium sulfite		10	None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 3 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
12-76	3/08/76	Unused phosphoric acid-based proprietary chemicals:			
		Chemical 1	10		2,000 ppm aluminum 2,000 ppm silicon 5 ppm barium 50 ppm iron 50 ppm calcium 200 ppm sodium
		Chemical 2	4		700 ppm aluminum 700 ppm silicon 10 ppm nickel 20 ppm iron 20 ppm calcium 100 ppm sodium
		Chemical 3	4		200 ppm aluminum 700 ppm silicon 40 ppm iron 20 ppm calcium 100 ppm sodium
		Chemical 4	3.5		600 ppm aluminum 600 ppm silicon 20 ppm iron 20 ppm calcium 60 ppm sodium
		Chemical 5	2		600 ppm aluminum 600 ppm silicon 20 ppm iron 20 ppm calcium 100 ppm sodium
		Chemical 6	4		250 ppm aluminum 250 ppm silicon 3 ppm nickel 1 ppm vanadium 5 ppm iron 10 ppm calcium 100 ppm sodium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 4 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
12-76 (continued)		Chemical 7	5		500 ppm aluminum 250 ppm silicon 5 ppm barium 2 ppm vanadium 2 ppm cobalt 1 ppm molybdenum 5 ppm nickel 10 ppm iron 30 ppm calcium 100 ppm sodium
		Chemical 8	1		200 ppm aluminum 200 ppm silicon 1 ppm barium 1 ppm vanadium 1 ppm nickel 10 ppm iron 10 ppm calcium 100 ppm sodium
		Chemical 9	1		500 ppm aluminum 250 ppm silicon 1 ppm barium 1 ppm vanadium 2 ppm nickel 5 ppm iron 10 ppm calcium 100 ppm sodium
		Chemical 10	1		300 ppm aluminum 300 ppm silicon 1 ppm barium 1 ppm vanadium 3 ppm nickel 5 ppm iron 15 ppm calcium 150 ppm sodium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 5 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
12-76 (continued)		Chemical 11	4		350 ppm aluminum 350 ppm silicon 2 ppm barium 2 ppm vanadium 3 ppm nickel 7 ppm iron 20 ppm calcium 200 ppm sodium
		Chemical 12	13		1,000 ppm aluminum 1,000 ppm silicon 10 ppm barium 100 ppm iron 30 ppm calcium 300 ppm sodium
		Chemical 13	11		700 ppm aluminum 700 ppm silicon 20 ppm iron 20 ppm calcium 200 ppm sodium
13-76	3/8/76	Unused sulfamic-acid-based proprietary chemicals: Chemical 1		75	100 ppm silicon 50 ppm calcium 10,000 ppm sodium
		Chemical 2		75	20,000 ppm sodium 2,000 ppm calcium
16-76	3/17/76	Used battery acid containing sulfuric acid and lead	107		5.7 normal hydrogen ion 0.2 ppm silver 0.05 ppm chromium 2 ppm lead 2 ppm copper > 100 ppm sodium
17-76	3/17/76	Used battery acid containing sulfuric acid	72		3.0 normal hydrogen ion 0.5 ppm nickel 0.5 ppm lead 1 ppm copper 50 ppm sodium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 6 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
18-76	3/25/76	Unused chemicals:			
		Nickel plating solution	0.75		pH approximately 7.0 >2% nickel 2,000 ppm boron 10 ppm cobalt 20 ppm copper 40 ppm manganese
		Copper sulfate		4	None
19-76	3/25/76	Unused chemicals:			
		Proprietary solution containing sulfuric acid and nitric acid	5		9.1 normal hydrogen ion 200 ppm copper 20,000 ppm sodium
		Fuming sulfuric acid	1		None
20-76	3/25/76	Unused chromic acid		100	None
21-76	6/29/76	Unused chemicals:			
		Sodium aluminate solution	55		pH = 10.5 1,000 ppm aluminum 40 ppm copper 200 ppm nickel 40,000 ppm sodium 20 ppm iron
		Proprietary caustic materials:			
		Chemical 1			
		Solution	55		pH = 11.8
		Powder		125	>100,000 ppm sodium 200 ppm phosphorus 5 ppm lead 2 ppm aluminum 50 ppm calcium
		Aluminum cleaner		400	pH = 11.2 10,000 ppm phosphorus 100,000 ppm sodium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 7 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
21-76 (continued)		All-purpose synthetic cleaner	55		pH = 11.2 1,000 ppm phosphorus 10 ppm copper 6,000 ppm sodium 10,000 ppm silicon 6 ppm iron
		Chemical 2		275	pH = 9.2 10,000 ppm phosphorous >100,000 ppm sodium 20,000 ppm silicon 50 ppm iron 20 ppm aluminum 200 ppm calcium
		Chemical 3	0.25		pH = 12.3 100 ppm aluminum 4 ppm barium 10,000 ppm sodium 1,000 ppm silicon 40 ppm calcium
		Alkaline rust remover		6	5 ppm manganese 100,000 ppm sodium 20 ppm strontium 10 ppm aluminum
22-76	6/29/76	Unused acid-plating solutions:			
		Cobalt plating solution	0.25		pH = 2.3 >20,000 ppm cobalt 200 ppm nickel 2 ppm magnesium
		Activating solution #2	0.25		100 ppm nickel >20,000 ppm sodium 10 ppm cobalt
		Nickel acid solution	0.125		pH = 1.5 30,000 ppm nickel 100 ppm copper 10 ppm manganese 10 ppm chromium 300 ppm cobalt

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 8 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
22-76 (continued)		Activating solution #1	0.25		0.2 ppm nickel 0.1 ppm aluminum 0.1 ppm iron
		Copper acid solution	0.25		pH = 1.1 20,000 ppm copper 20 ppm nickel 10 ppm iron
		Used Zinctone solution containing nitric, sulfuric, and chromic acid	20		None
23-76	6/29/76	Unused chemicals:			
		Copper sulfate		100	None
		Ferric sulfate		2	
		Sodium hypophosphite		0.25	
		Urea		1	
		Vanadium pentoxide	0.25		
		Proprietary solution	0.37		pH = 7.3 >20,000 ppm nickel 10,000 ppm phosphorus 1,000 ppm cobalt 10 ppm chromium
24-76	7/12/76	Caustic materials in drums found onsite (4 drums):			
		Drum 14		55	500 ppm aluminum 500 ppm iron 100 ppm uranium 10 ppm chromium 2,000 ppm calcium 50 ppm strontium 50 ppm nickel 5 ppm lead >100,000 ppm sodium 5 ppm manganese 1 ppm copper 1,000 ppm silicon 10 ppm magnesium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 9 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
24-76 (continued)		Drum 40		39	1,000 ppm aluminum 500 ppm iron 100 ppm nickel 20 ppm strontium 10 ppm chromium 5 ppm manganese 50 ppm barium 100,000 ppm sodium 10 ppm magnesium 200 ppm calcium 100 ppm silicon
		Drum 31	15.5		pH = 8.5 >3,000 ppm copper 30 ppm nickel 6 ppm cadmium 5 ppm aluminum 10 ppm magnesium 300 ppm calcium 60 ppm sodium
		Drum 39	0.5		90 ppm iron 90 ppm manganese 4 ppm chromium 1 ppm nickel 2 ppm barium 900 ppm sodium 40 ppm aluminum 1 ppm magnesium
25-76	7/12/76	Strong acid solution found in drum	1.5		4,000 ppm iron 800 ppm nickel 800 ppm molybdenum 400 ppm copper 80 ppm chromium 40 ppm manganese 40 ppm cobalt 4 ppm vanadium 80 ppm aluminum 8 ppm magnesium
26-76	8/05/76	Used battery acid containing sulfuric acid and lead	60		None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 10 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
27-76	8/17/76	Unused chemicals:			
		Acetic acid	0.75		None
		Diethanolamine	0.25		None
		Mercuric nitrate	0.125		None
		Sodium hydroxide	0.25		None
		Mercaptoacetic acid	0.125		None
		Choline chloride		2.25	None
		Deoxycholic acid		0.125	None
		Phosphomolybdic acid		1	None
		Sodium chromate		2	None
		Trichloracetic acid		0.25	None
28-76	8/17/76	Used phosphorus pentaoxide desiccant		5	None
29-76	8/17/76	Used ethylenediaminetra-acetic acid solution	185		10 ppm chromium 6,000 ppm copper 6,000 ppm iron 600 ppm manganese 100 ppm molybdenum 1,000 ppm sodium 300 ppm nickel 100 ppm lead 10 ppm zinc 30 ppm aluminum 100 ppm calcium 100 ppm magnesium
30-76	9/2/76	Used hydrochloric acid solution (<1 normal) contains 1 g beryllium	0.25		None
31-76	10/01/76	Sodium nitrate contaminated with dirt		150	None
32-76	10/11/76	Used battery acid containing sulfuric acid and lead	301.5		None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 11 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
33-76	10/28/76	Used wetting and foaming agent from testing of corrosion rate with uranium; test makeup included 0.003 lb uranium and 0.006 gal wetting and foaming agent	5		None
34-76	12/14/76	Used inhibited hydrochloric acid cleaning solution from derusting of degreasing solvent storage tank; makeup solution of 20% hydrochloric acid and 1% amine-based inhibitor	2,000		None
1-77	1/24/77	Unused 35% hydrogen peroxide solution	6		None
2-77	2/28/77	Unused chemicals:			
		Phosphoric acid	0.25		None
		Acetic acid	2.5		None
3-77	3/01/77	Unused ammonium bifluoride crystals		400	None
4-77	3/07/77	Unused chemicals:			
		Nickel chloride		5	None
		Nickel sulfate		5	None
		Sodium phosphate		1	None
		Sodium borate		1	None
		Boric acid		1	None
		Cupric sulfate		6	None
		Lithium fluoride		1	None
		Aluminum chloride		1	None
		Sodium fluoride		1	None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 12 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
6-77	3/09/77	Unused chemicals:			
		Ammonium fluoride		4	None
		Sodium fluoride		2.5	None
		Sodium chromate		4	None
		Ammonium citrate		3	None
		Oxalic acid		12	None
		Citric acid		6	None
		Barium perchlorate		4	None
		Ammonium ceric sulfate		4	None
8-77	3/09/77	Unused chromic acid		6	None
11-77	4/13/77	Unused chemicals:			
		Potassium nitrate		2	None
		Potassium dichromate		2	None
		Sodium dichromate		1	None
		Sodium citrate		1	None
		Sodium acetate		1	None
13-77	5/23/77	Used sulfuric acid solution	450		70% sulfuric acid solution; 0.2 ppm silver 10 ppm barium 5 ppm cobalt 100 ppm chromium 30 ppm copper 50 ppm manganese 500 ppm molybdenum 500 ppm nickel 10 ppm lead 5 ppm vanadium 30 ppm iron 10 ppm magnesium 3 ppm titanium 300 ppm zinc
		Used nitric acid solution	50		None
14-77	6/13/77	Unused nickel sulfate solution containing 62 g/L of nickel sulfate	20		None

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 13 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
15-77	9/13/77	Unused chemicals:			
		Proprietary alkaline rust remover		440	>100,000 ppm sodium 2,000 ppm calcium 500 ppm iron
		Proprietary chemical (apparently contains sodium bisulfate)		200	>100,000 ppm sodium
		Ammonium persulfate		220	None
		Ethylenediamine	39		None
16-77	9/13/77	Used drum dryer product containing aluminum nitrate and sodium nitrate		400	30,000 ppm aluminum 50,000 ppm calcium 100 ppm copper 3,000 ppm iron 5,000 ppm magnesium 10 ppm manganese 100,000 ppm sodium 10 ppm boron
5-78	5/02/78	Unused proprietary rust prevention material containing sodium nitrite		55	None
6-78	5/08/78	Used absorbing solution consisting of neutral salt mixture of mercuric chloride (10 g/L) ethylenediaminetetraacetic acid (0.07 g/L) and potassium chloride (6 g/L)	10		None
8-78	9/07/78	Used copper strip solution containing depleted uranium	200		0.66 lb/gal nitric acid 1.22 lb/gal copper 0.18 lb/gal uranium 15 ppm cobalt 2 ppm chromium 2 ppm manganese 2 ppm nickel 2 ppm titanium

Summary of Nonroutine Waste Treated in the 300 Area Waste Acid Treatment System Prior to November 19, 1980. (sheet 14 of 14)

Waste disposal permit number	Permit date	Material description	Quantity (gal)	Quantity (lb)	Summary of lab results
2-79	1/26/79	Waste nitric acid solution containing depleted uranium	526		111 lb (total) of depleted uranium; 810 lb (total) of nitric acid
4-79	7/05/79	Used derusting solution; prior to neutralization with sodium hydroxide, solution consisted of 2.5% oxalic acid, 3.9 vol% hydrogen peroxide, and 0.01 vol% of concentrated sulfuric acid	165		None
5-79	10/30/79	Unused chromic acid plating solution containing 40 oz/gal chromic acid and 1% sulfuric acid	30		None
6-79	10/30/79	Dilute beryllium sulfate solution containing 10 ppm beryllium sulfate from testing of effects on trout fry and eggs		220	None
8-79	12/13/79	Used copper strip solution containing depleted uranium		300	300 g/L nitric acid 185 g/L copper 14.37 g/L uranium 2 ppm silver 2 ppm manganese

APPENDIX 6A

PHASED CLOSURE DOCUMENTATION

Enclosure 10

2401-W Waste Storage Building Closure Plan

(Attachment 49)

DOE/RL-99-46

UC-630

2401-W Waste Storage Building Closure Plan

United States
Department of Energy
Richland, Washington

CONTENTS

APPENDICES

FIGURE

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GLOSSARY

2401-W	2401-W Waste Storage Building
CWC	Central Waste Complex
DOE-RL	U.S. Department of Energy, Richland Operations Office
Ecology	Washington State Department of Ecology
PCB	polychlorinated biphenyl
RCRA	*Resource Conservation and Recovery Act of 1976*
RMIS	Records Management Information System
TSD	treatment, storage, and/or disposal
WAC	Washington Administrative Code

2401-W WASTE STORAGE BUILDING CLOSURE PLAN

This plan describes the performance standards met and closure activities conducted to achieve clean closure of the 2401-W Waste Storage Building (2401-W) (Figure 1). In August 1998, after the last waste container was removed from 2401-W, the U.S. Department of Energy, Richland Operations Office (DOE-RL) notified Washington State Department of Ecology (Ecology) in writing that the 2401-W would no longer receive waste and would be closed as a *Resource Conservation and Recovery Act* (RCRA) *of 1976* treatment, storage, and/or disposal (TSD) unit (98-EAP-475). Pursuant to this notification, closure activities were conducted, as described in this plan, in accordance with Washington Administrative Code (WAC) 173-303-610 and completed on February 9, 1999. Ecology witnessed the closure activities. Consistent with clean closure, no postclosure activities will be necessary. Because 2401-W is a portion of the Central Waste Complex (CWC), these closure activities become the basis for removing this building from the CWC TSD unit boundary.

The 2401-W is a pre-engineered steel building with a sealed concrete floor and a 15.2-centimeter concrete curb around the perimeter of the floor. This building operated from April 1988 until August 1998 storing non-liquid containerized mixed waste. All waste storage occurred indoors. No potential existed for 2401-W operations to have impacted soil. A review of operating records and interviews with cognizant operations personnel indicated that no waste spills occurred in this building (Appendix A). After all waste containers were removed, a radiation survey of the 2401-W floor for radiological release of the building was performed December 17, 1998, which identified no radiological contamination (Appendix B).

1.0 CLOSURE PERFORMANCE STANDARD

Closure of 2401-W was conducted to meet the closure performance standards of WAC 173-303-610(2). 2401-W was considered clean after the entire building floor was verified to be free of dangerous waste contamination by meeting a visual performance standard. The visual performance standard was: no obvious visual signs of potential dangerous waste contamination, except for waste staining consisting of light shadows, slight streaks, or minor discoloration. Achievement of this standard was verified by visual inspections. Any floor area not meeting this standard would have required removal of the indication, a radiation survey, and re-inspection of the removal area.

Because only mixed waste was stored in 2401-W, the presence of radionuclides was considered an indicator parameter for the presence of the dangerous component of the mixed waste. Locations not meeting the visual performance standard, along with floor areas randomly selected during visual inspections, also were required to meet a radiological performance standard. The radiological performance standard, where applied, was: no measurable amount of radiological contamination above background levels. Radiological background was established as described in Appendix B. Achievement of this standard was verified by radiation surveys (Appendix B). Any location that exceeded radiological background would have required removal of the indication, visual inspection, and resurvey.

2.0 CLOSURE ACTIVITIES

This section identifies the closure activities performed to verify 2401-W clean closure conditions. If the record review (Section 2.2) had identified waste spills or if visual or radiological indications had been identified during inspections and surveys (Section 2.3), the floor would have been decontaminated to remove the indications and the removal area re-inspected and resurveyed. However, because no visual or radiological indications were identified (Appendix B), no decontamination or further activities (e.g., soil or structure sampling) were considered necessary to verify clean closure.

2.1 Closure Activities

By the time of closure, all waste containers had been removed from the 2401-W and no waste handling equipment remained in the building. Closure activities performed to verify 2401-W clean closure conditions consisted of the following:

- Reviewed documents and interviewed personnel to determine spill history (Appendix A)
- Visually inspected building floor
- Performed radiation survey of randomly selected floor locations
- Documented visual inspections and radiation surveys on an inspection checklist (Appendix B)
- Obtained preliminary professional engineer's (PE) statement that closure activities were completed in accordance with this closure plan (Appendix C).

After the closure plan is approved by Ecology, closure certification will be submitted to Ecology in accordance with WAC 173-303-610(6) and the CWC TSD unit boundary will be modified to exclude 2401-W.

2.2 Search of 2401-W Operating Records for Spill History

2401-W operating records were reviewed to identify whether mixed waste spills had occurred. The records included operations logbooks, RCRA weekly inspection records, and 'offnormal' event reports. Former and current cognizant operations personnel also were interviewed. Sufficient operating records and reports exist and cognizant personnel were available to establish a complete history of 2401-W operations. The operating history indicated that no mixed waste spills occurred in 2401-W (Appendix A).

2.3 Visual Inspection and Radiation Surveys

Visual inspection of the 2401-W floor and loading ramp was performed February 9, 1999. The inspections were documented on the radiation survey and visual inspection checklist (Appendix B). No visual indications of potential dangerous waste contamination were identified that required removal or a follow-up radiation survey. During the inspections, one floor area located in grid D-1 was cleaned with damp rags to remove dirt that potentially could have masked a visual or radiological indication (Appendix B). No visual or radiological indication was identified by the visual inspection and radiation survey of the cleaned area.

A radiation survey of randomly selected areas of the floor, the loading ramp, and of the dirt removal area was performed at the time of the visual inspections (Appendix B). The 'direct survey' and 'large area wipe' were the radiation survey methods used and were performed as described in Appendix B. No surveyed area showed measurable radiological levels above background levels.

3.0 CERTIFICATION OF CLOSURE

After completing closure activities, a preliminary PE statement (Appendix C) that the activities were performed in accordance with technical specifications of the closure plan was prepared and provided to Ecology (99-EAP-202). After approval of this closure plan by Ecology, final 2401-W closure certification will be prepared in accordance with WAC 173-303-610(6), transmitted to Ecology, and placed in the Administrative Record.

4.0 REFERENCES

98-EAP-475, Letter to L. J. Cusack, Ecology from James E. Rasmussen, DOE-RL, "Notification of Intent to Close the 2401-W Waste Storage Building", August 28, 1998.

99-EAP-202, Letter to Moses N. Jaraysi, Ecology from J. E. Rasmussen, DOE-RL, "Closure of the 2401-W Waste Storage Building", March 29, 1999.

DOE/RL-91-17, *Hanford Facility Dangerous Waste Permit Application, Central Waste Complex*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

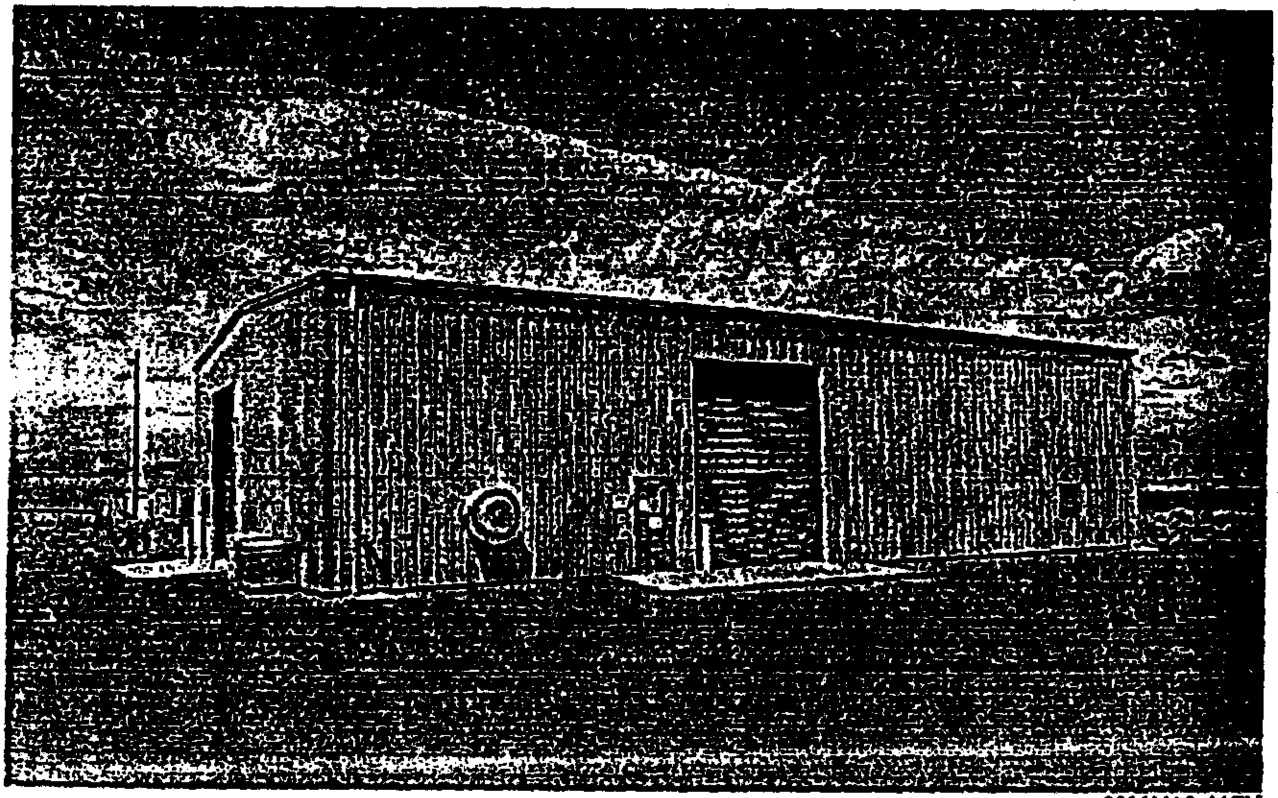
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Figure 1. 2401-W Waste Storage Building.

APPENDIX A

SEARCH OF CENTRAL WASTE COMPLEX OPERATIONS RECORDS FOR 2401-W WASTE STORAGE BUILDING SPILL HISTORY

SEARCH OF CENTRAL WASTE COMPLEX OPERATING RECORDS FOR 2401-W WASTE STORAGE BUILDING SPILL HISTORY

For closure of CWC, or any portion of CWC, operating records are reviewed and cognizant operations personnel interviewed to obtain spill history for the portion(s) undergoing closure (DOE/RL-91-17, Rev. 1, Chapter 11.0, Section 11.1.2). Spill history is necessary to help determine the need for and extent of decontamination necessary for clean closure. Closure of 2401-W , a portion of CWC, necessitated such activities to identify dangerous waste spills (if any) to surfaces of the building. As activities required by the approved closure plan, the operating records review and personnel interviews used to establish 2401-W spill history were intended to be sufficiently diligent to allow PE certification of the activities and for use as a credible basis in establishing conclusive 2401-W spill history. Certification by a registered professional engineer (PE) will be obtained.

The records review entailed a page by page review of all available records related to 2401-W operations. The records reviewed to satisfy this requirement included operations logbooks, RCRA weekly inspection records, and a search for 'offnormal' event reports. Also as a requirement, former and current cognizant 2401-W operations personnel were interviewed. Because closure of the 2401-W represents partial closure of CWC, the results of the document review and of personnel interviews will become the basis for removal of the 2401-W from the CWC TSD unit boundary by revision of the CWC Part A, Form 3, and Part B permit applications.

Operating documents and records currently are located as follows.

- Occurrence reports are located at MO 278.

- The most current CWC operating logbook is located in MO-288.

- Weekly inspection records before 1997 were retrieved from Records Management Information System (RMIS).

- All other records were found in the CWC regulatory file located at MO 720.

Background Information

In April 1988, waste storage operations began at the 2401-W. Weekly inspection records for 2401-W show that for all or most of the first 4 months of operations (until 08/03/88) little or no waste was stored in the building. This building was designed to meet all the requirements for storage of mixed waste (DOE/RL 91-17) in metal boxes or drums. Only containers in good condition were accepted. Transuranic waste was double contained. Where incidental free liquids were known to exist, containers were required to be packed with two times the calculated quantity of absorbent required to absorb the entire quantity of free liquids

Operations logbooks document the quantity of waste received at this unit and how waste was managed. These logbooks confirm that this building managed small quantities of specialized waste. When stored, the waste containers were seldom moved and remained in good condition after waste acceptance. Consequently, there was little potential for spills from defective containers, damaged or leaking containers due to container mishandling, or container degradation from weathering. The waste typically remained as stored until all waste finally was removed in August 1998 in preparation for building closure.

Records Review and Personnel Interviews

The event fact sheets, located in MO 278, and occurrence reports relating to CWC operations were reviewed. No event fact sheets or occurrence reports were generated for the 2401-W.

The CWC daily operating logbooks represent the most comprehensive, first-hand record of operations and cover the entire period of 2401-W operations. There are no logs dedicated solely to operations of the 2401-W. Except as noted, handwritten logbooks were available for review from 1988 to present. From the beginning of operations until October 1990, daily operations for all solid waste units (CWC, 224-T Transuranic Waste Storage and Assay Facility, 616 Nonradioactive Dangerous Waste Storage Facility, and Low-Level Burial Grounds) were consolidated into handwritten logbooks identified as sequentially numbered daily operating records (DOR). From February 1991 to the present, a separate logbook has been kept for each unit. The practice of uniquely numbering each operating logbook was discontinued in October 1996.

Handwritten logbooks were not available for review for October 1990 until February 1991, which was the transition period to the new, unit-specific logbooks. During this period, the DORs consisted of typewritten reports summarizing operators' handwritten pocket notebooks. These reports were generated daily and were an authoritative representation of normal daily occurrences and of significant events (e.g., waste shipments and process upsets, such as spills). Typewritten reports were available for the period of operations for which the daily handwritten logs were not available.

The following logbooks and reports were reviewed for evidence of spills. Although mention is made in logbooks of cleanup of rainwater and snowmelt that entered under the building's rollup doors, no mention is made of dangerous waste spills or container breaches that could have lead to spills.

- Logbook - SW-DOR-00003 (10/88 – 9/89)
- Logbook - SW-DOR-00004 (9/89 – 10/90)
- Report - SW-DOR-00005 (9/90 – 9/90, September only)
- Report - SW-DOR-00006 (10/90 – 9/91, Part 1 of 3)
- Logbook - SW-CWC-00001 (2/91-2/93)
- Logbook - SW-CWC-00002 (2/93-8/93)
- Logbook - SW-CWC-00003 (9/93-1/94)
- Logbook - SW-CWC-00004 (1/94-5/94)
- Logbook - SW-CWC-00005 (5/94-9/95)
- Logbook - SW-CWC-00006 (10/95-10/96)
- Logbook (10/96-6/97)
- Logbook (6/97–8/97)
- Logbook (8/97-4/98)
- Logbook (4/98-12/98)
- Logbook (12/98-present).

Weekly RCRA Inspections. Weekly inspections of 2401-W surfaces and of stored containers were documented on checklists. Checklist inspection parameters included unit cleanliness, storage surface integrity, container integrity, and indication of spills. The checklists were complete for the period of operations. Weekly inspection checklists do not indicate any leaking, damaged, or breached waste containers or evidence of spills on containment surfaces near containers. However, the inspection for September 7, 1988 identified that a "small amount" of oil had been spilled to the floor from a forklift by the east door but had been cleaned up immediately. The following weekly inspection records were reviewed for evidence of spills.

- June 1988 through December 1997 (retrieved from RMIS):
  - SW-2401-W-1989
  - SW-2401-W-1990
  - SW-2401-W-1991
  - SW-2401-W-1992
  - SW-2401-W-1993
  - SW-2401-W-1994
  - SW-2401-W-1995
  - SW-2401-W-1996.

- Weekly Inspection checklists for January 1997 to present (CWC regulatory file):
  - No log number (1/97 – 3/97)
  - No log number (4/97 – 6/97)
  - No log number (7/97 – 9/97)
  - No log number (10/97 – 12/97)
  - No log number (1/98 – 3/98)
  - No log number (4/98-6/98)
  - No log number (7/98-9/98)
  - No log number (9/98-present).

Operations Personnel Interviews. Cognizant current and former CWC operators and operations managers were interviewed for direct or indirect knowledge of waste spills or container breaches in the 2401-W. Management and hands-on operators for the entire period of 2401-W operations were interviewed. All personnel interviewed were asked the following question: "Are you aware of any waste spills, leaks, or waste container breaches in the 2401-W Building?"

Operations managers interviewed.

- The CWC Operations manager from 1987 to November 1990 and again from June 1997 to the present, was interviewed in person October 28, 1998. He responded that during his tenure as operations manger, no spills or container breaches occurred in the 2401-W Building.

- The CWC Operations manager from November 1990 to March 1993 was interviewed in person October 28, 1998. He responded that during his tenure as operations manager, no spills or container breaches occurred in the 2401-W Building.

- The CWC Operations supervisor from March 1993 to June 1997 responded electronically to the potential for leaks at 2401-W on December 10, 1998. She stated that during her tenure as operations manager, no spills or container breaches occurred in the 2401-W Building.

Cognizant operators.

- A CWC Nuclear Process Operator (NPO) from 1988 to the present was interviewed in person October 29, 1998. He stated there had not been any spills or container breaches since the beginning of 2401-W operations.

- A CWC NPO from before 1988 to the present was interviewed October 28, 1998 by telephone. He indicated that no spills or container breaches occurred since the beginning of 2401-W operations.

- A CWC NPO from before 1988 to the present was interviewed December 10, 1998 by telephone. He indicated that that no spills or container breaches occurred since the beginning of 2401-W operations.

Results of Records Review and Personnel Interviews

The operating records review and personnel interviews used to establish 2401-W spill history were sufficiently diligent to allow PE certification of these closure activities and for use as a credible basis in establishing conclusive 2401-W spill history.

Sufficient operating records and reports exist, and cognizant personnel were available for interview, to establish that an authoritative and complete record of 2401-W operations exists.

Operating records and reports and personnel interviews identify no spills to 2401-W surfaces. No occurrence reports were written to document releases to the 2401-W. No mention is made in daily operations logs or in weekly inspection reports of waste spills to 2401-W floors. All personnel interviewed indicated that to their direct or indirect knowledge, no waste leaks or container breaches occurred that could have contaminated 2401-W surfaces. Further, stringent waste acceptance criteria for containers, the relatively small quantity of waste managed at this unit, the minimal level of container handling once waste was stored, and the fact that degradation of containers by weathering was not a factor, greatly minimized the potential for spills.

From the records, reports, and interviews documented herein, it reasonably can be concluded that no dangerous waste spills occurred to the floors of the 2401-W.

APPENDIX B

RADIATION SURVEY AND VISUAL INSPECTION CHECKLIST

RADIATION SURVEY AND VISUAL INSPECTION CHECKLIST FOR CENTRAL WASTE COMPLEX CLOSURE ACTIVITIES

Instructions for completing this checklist are on pages 3 and 4.

1. Structure undergoing closure: 2401-W Storage Building (Floor Plan, page 5)

2. Components/materials being inspected: Epoxy-coated concrete floor

3. Structure spill history:

   (1) The document reviews and personnel interviews required for determining spill history are complete.

   Chris R. Haas , CR Haas for BM Barnes 2-8-99
   Signature Printed name Date

   (2) Spill(s) are identified on building floor plan. NA [NA per step 3(1) if no documented spills]
   ____/____ (Initial/date)

4. Assigned visual inspectors and radiation survey personnel:

   (1) Visual inspector(s):

Name	Signature	Initials
M K Hatfield	[illegible]	MKH
D.E. Peacher Jr	[illegible]	DEP
D.R. Wyse	[illegible]	DW

   Assigning manager: [illegible signature] 2/9/99
   Signature Date

   (2) Radiation survey personnel:

Name	Signature	Initials
Rhonda Harper	Rhonda Harper	RH
Roger Holcombe	R.D. Holcombe	RH
Emily Millikin	Emily Millikin	EM

   Assigning manager: JL Miller EJ Millikin for 2/9/99
   Signature Date

5. Initial Radiation Survey

   (1) Initial radiation survey(s) completed. (Initial/date) RS 2-9-99

   (2) Radiological performance standard met for all surveyed locations. (Yes or No) Yes
   (Initial/date) RS 2-9-99. If No, do step 7.

   (3) Radiation survey comments (if any): Survey of Random cleanup areas performed. no Contamination was found.

   RS 2-9-99 (Initial/date)

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6. **Initial Visual Inspection**

(1) Initial visual inspection of all locations is complete. (Initial/date) DSP 12-9-99

(2) Visual performance standard met for all locations. (Yes or No) Yes
(Initial/date) DSP 12-9-99. If No, do step 7.

(3) Visual inspection comments (if any): ~~None~~ DSP 12-9-99 Cleaned stain in section D1 and Resurveyed area.

DSP 12-9-99 (Initial/date)

7. **Decontamination and Verification** n/a [NA if Steps 5(2) and 6(2) are marked Yes]

(1) Decontamination method used: ______

_____/_____ (Initial/date)

(2) Comments on decontamination (if any): ______

_____/_____ (Initial/date)

(3) Decontamination is complete.
_____/_____ (Initial/date)

Note: Decontamination waste will be collected, designated, and disposed of accordingly.

(4) Verification of visual and radiological performance standards for decontaminated locations.

(a) Radiation survey complete and radiological performance standards met at all decontaminated locations. _____/_____ (Initial/date)

(b) Visual inspection complete and visual performance standard met for all decontaminated locations. _____/_____ (Initial/date)

8. Additional comments (if any): None

DSP 12-9-99 (Initial/date)

9. The checklist is complete. DSP 12-9-99 (Initial/date)

Note: Forward the completed checklist to the CWC Environmental Compliance Officer for placement in the CWC regulatory file.

RADIATION SURVEY AND VISUAL INSPECTION CHECKLIST FOR CENTRAL WASTE COMPLEX CLOSURE ACTIVITIES

Instructions for Completion

1. Identify the CWC structure undergoing closure.

2. Identify the portion of the structure undergoing closure and the type of material (e.g., coated concrete floor).

3. (1) An assigned inspector [step 4(1)] or other cognizant Solid Waste personnel will sign this step when document reviews and personnel interviews required by the closure plan to establish spill history for the locations identified at steps 1 and 2 are complete and documented. If no spills occurred, mark step 3(2) NA.

   (2) If this step is not marked NA, an assigned inspector will sign off that spill history documentation completed for step 3(1) has been reviewed and the location of all documented spills is shown on the gridded floor map (page 5) for inspection.

4. (1) and (2). The appropriate manager will sign off this step when visual inspection and radiation survey personnel are assigned. Inspection and survey personnel will sign and print their name and enter their initials.

5. (1) Initial radiation survey(s) are anticipated to occur at the time of the visual inspections. Inspector(s) will sign off that all randomly selected locations and all visual indications [step 6(2)] have undergone initial radiation survey as described below and all surveyed locations and the survey method used are documented on attached floor plan.

   Performing the radiation survey:

   - **Establishing radiological background.** Radiological background will be established using onsite methods and good health physics practices. The health physics technician will enter the building, turn on the instrument, set the range switch to the lowest range, and allow a 10-second warm up. For the Geiger-Mueller portable survey instrument, the maximum background is limited to 150 counts per minute. Instrument efficiency is based on the instrument being held within ¼" of the surface. For the portable alpha meter, 3 counts per minute will allow efficient operation.

   - **Radiation survey methods.** Radiation survey(s) will consist of using appropriate hand-held instrumentation and/or of smears that will be read with stationary equipment located at MO-438. Large area wipe (LAW), technical smear (TS), static measurement (SM), and scan measurement (Scan) will be used as considered necessary. LAWs entail wipedown of an area approximately 300 square centimeters by hand with a swipe media. The surface is counted with the portable instrument. A TS entails taking wipes of an area approximately 100 square centimeters with the swipe media which is counted by stationary equipment located as MO-438. SMs entail holding the probe within ¼ inch of the area to be surveyed and holding at that location for 10 to 20 seconds. Scans entail holding the probe ¼ inch from the surface and scanning a location at a travel speed of approximately 2 inches per second.

(2) The radiological performance standard is 'no measurable amounts of radiological contamination above background levels'. Any spot, area, or location that exceeds radiological background will be considered a radiological indication that will be identified on the attached floor plan. <u>The TS method will be used to identify the extent of radiological contamination.</u>

(3) Enter any comments regarding the radiation survey.

Note: A current radiological release for the entire 2401-W Storage Building is documented on Radiological Survey Report, Number SW 243073 (Attachment 1).

6. (1) Initial visual inspections will be considered complete and this step signed off when all locations identified in steps 1 and 2 and on the floor plan (page 5) have been inspected for achievement of the visual performance standard.

(2) The dangerous waste performance standard is 'no obvious visual signs of potential dangerous waste contamination'. Surfaces must be free of indications of dangerous waste, except for residual waste stains consisting of light shadows, slight streaks, or minor discoloration. A visual indication is any area that does not meet this standard. *Note: This visual standard is more stringent than the 40 CRF 268.45 'clean debris surface' standard for clean closure of containment structures recommended in Ecology's Guidance for Clean Closure of Dangerous Waste Facilities (Publication #94-111) that allows residual staining <u>and</u> some waste to remain after closure.*

(3) Enter any comments regarding the visual inspections.

7. (1) Surface(s) will be decontaminated by being washed, wiped, or scrubbed by hand using damp cloths, paper towels, or brushes and, as necessary, a nonregulated cleaner or detergent. The decontamination method and materials used will be entered.

(2) Enter any comments regarding decontamination.

(3) This step is signed off when all locations shown as requiring decontamination by steps 5(2) and 6(2) are decontaminated.

(4) (a) Sign off step after all decontaminated locations are surveyed <u>using the TS method</u> (unless survey personnel identify a more appropriate survey method) and the radiological performance standard described in step 5(2) is met.

(b) Sign off step when all decontaminated location(s) have been visually inspected and the visual performance standard described in step 6(2) is met.

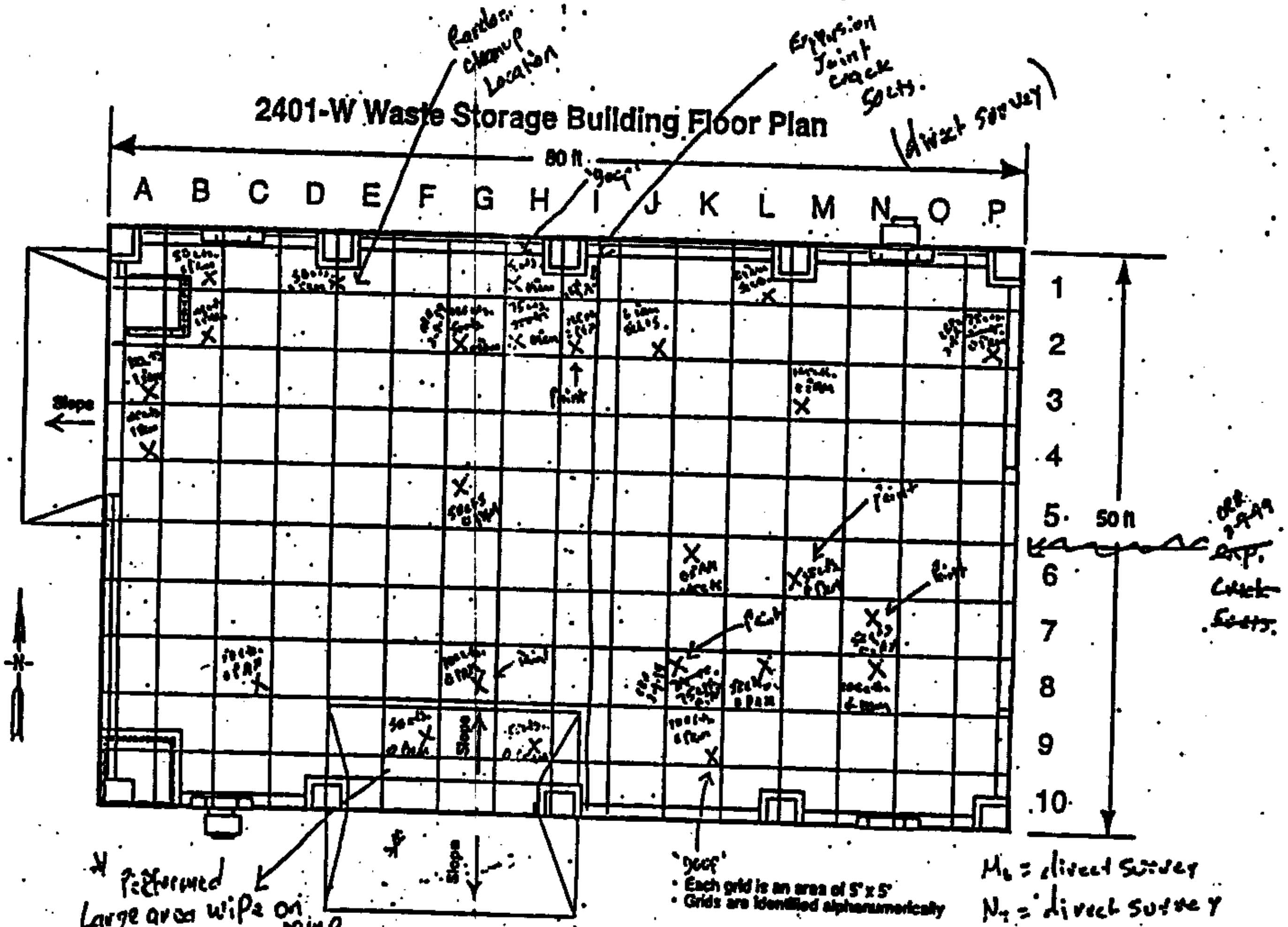
Note: Decontamination waste will be collected, designated, and disposed of accordingly.

8. Enter any comments not previously entered.

9. This step is signed off when inspector(s) have reviewed the checklist and all steps are complete and verified, and all visual and radiological indications identified on the floor plan (page 5) are dispositioned. *Note: The completed checklist is to be forwarded to the CWC Environmental Compliance Officer for placement in the CWC regulatory file.*

990203.1558

2401-W Waste Storage Building Floor Plan



- Each grid is an area of 5' x 5'
- Grids are identified alphanumerically

990120211.2301

M_6 = direct survey
N_7 = direct survey

direct survey = 'scan'

B_1 = direct survey
D_1, E_1 = direct survey
H_1 = direct survey
L_1 = direct survey
P_2 = direct survey

H_2 = direct survey
J_2 = direct survey
C_2 = direct survey
B_3 = direct survey
M_4 = direct survey

G_5 = direct survey
L_8 = direct survey
N_8 = direct survey
C_4 = direct survey
K_9 = direct survey

F_9, H_9 = direct survey
A_3, A_4 = direct survey
K_8 = direct survey
G_8 = direct survey
I_2 = direct survey

PROJECT HANFORD RADIOLOGICAL SURVEY REPORT

Survey Report No. SW 243073

Page 1 of 2

Date	Time (Start/Stop)	Area/Bldg./Room/Location	F.C.
12-17-98	1030 / 1130	200 WEST / 2401-W / 204	SW

RWP Number	Work Package/Job Control Package/JSA	Routine Surveillance Task Number	Radiological Shipping Rec. Number
SW-001	N/A	N/A	N/A

Purpose of Survey (check appropriate box(es)): ☐ Job Coverage, ☐ Required Task, ☐ Material Release, ☐ Ram Shipment

Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill   Alarm Response: ☐ Cam, ☐ ARM, ☐ APM

☐ Exposure Incident ☒ HRA/VHRA Work (Limited) Other: AREA SURVEY

Job Description: SURVEYED ENTIRE FLOOR AREA OF 2401-W BECAUSE BUILDING WAS EMPTY AND RELEASE SURVEY WAS REQUIRED. N/C
N/C

DOSE RATE MEASUREMENTS Note 1 F = Field (≥30 cm) C = Contact (≤1 cm)

No.	Description	Dist. (cm) Note 1	WO (mR/hr)	WC (mR/hr)	CF_β	CF_γ	Neutron Dose (mrem/hr)	Shallow Dose (mrem/hr)	Deep Dose (mrem/hr)
	N/A								

CONTAMINATION (C) MEASUREMENTS

No.	Description	Direct Gross cpm/PA βγ	Direct Gross cpm/PA α	Background βγ	Background α	Total dpm/100 cm² βγ	Total dpm/100 cm² α	Removable dpm/100 cm² βγ	Removable dpm/100 cm² α
1	Large AREA WIPES of	N/A							
↓	TOTAL FLOOR (>1000 cm²)	N/A					→	<1000	<BKG
2	SPOT CHECK DIRECT FOR	N/A							
↓	Alpha (Floor Area)	80	0	80	0	<5000	<500	N/A	N/A
3	Technical Swipes (10)	N/A							
↓	Taken on Floor Area	N/A					→		<20
	N/A								

AIR SAMPLE MEASUREMENTS (μ Ci/ml)

	BZ	GA	Initial	Decay		BZ	GA	Initial	Decay
α 1			N/A		α 2			N/A	
βγ 1					βγ 2				

Sample Counter Log Number or Sample ID Number: SW 12171998 104
N/A

BD-6000-010 (11)

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Map/Sketch

N A

LEGEND: Smear; Air Sample; LAW; Hotspot; Contact Reading; (designation inside); Radiological Area Boundary; Dose Rates in mrem/h unless otherwise noted

COMMENTS: (Additional information as necessary to interpret results)

N A

Instr./Probe Model	RO-3B (CP)	GM Model g-m probe	PAM	GM Model G-M Probe	PAM	SAC-4
Serial No.	N/A	CMEB5-0092	ACHN2 0314	CMEB8-0190	ACHN2 0025	CSEB3 0027
	NA	DTEB9-0522	DTHN3 0074	DTHNC-0777	DTHN3 0526	N/A
Efficiency (used)	NA	.10	.14	.10	.14	.57

R. Holcombe 12-17-98 / R. Stapel 12-17-98 Payroll No.: 64811 / 81775	Reviewer: Date: 12/17/98 Payroll No.: 66703
Name (Print): R. Holcombe / R. Stapel	Name (Print): Joel "Wane" Britter
Signature: R. Holcombe / R. Stapel	Signature: Joel "Wane" Britter

BD-5000-010A (11/97)

APPENDIX C

PRELIMINARY PROFESSIONAL ENGINEER CLOSURE STATEMENT

Attachment 01 Page 1 of 1
CO-99-WMH-073
February 12, 1999

PRELIMINARY PROFESSIONAL ENGINEER'S STATEMENT FOR CLOSURE OF THE 2401W STORAGE BUILDING

Chapter 11 of the "Hanford Facility Dangerous Waste Permit Application" (DOE/RL-91-17 Rev 1) gives the closure requirements for the Central Waste Complex Storage Facilities (CWC). The document is in the process of approval by the Washington State Department of Ecology. Closure activities based on the current document have been completed.

Periodic site visits, phone conversations and document reviews were conducted to observe and document the closure activities. Each inspection activity was recorded on the Inspection Checklist for CWC Closure Activities. My field trip observations are recorded on Field Trip Report forms.

All requirements for closure activities stipulated by the current closure documents have been met. The periodic inspections including the final inspection revealed no discrepancies.

The final certification of closure statement will be issued upon Ecology approval of the closure document.

Ronald G. Hollenbeck 2-12-99

Ronald G. Hollenbeck, P.E.
Washington #23750
Fluor Daniel Northwest Inc.